

THE IRON AGE

Special Articles



The applications, advantages and limitations of the use of radioactive isotopes used as tracers in metallurgical research and development are evaluated in "Radioactive Isotopes in Metallurgy," starting on p. 77. The use of strain gages in transverse testing of Meehanite iron beams is described in the article, "Transverse Tests on Meehanite Iron Beams," beginning on p. 83. The investigations show how the material behaves at ultimate loads, as well as at moderate load levels.

Issue Highlights



From his standpoint, Phil Murray scored two of the biggest victories of his career last week. Those in management who have long respected him as a responsible labor leader are glad he is still top man but they shudder to contemplate the cost of his victories to their companies.—p. 111.



If stockholders approve, Detroit Steel will buy Portsmouth Steel in a move that will complement the production facilities of each company. A new hot strip mill and an electricweld pipe mill, primarily for oil country line pipe and casing, will be installed at Portsmouth.—p. 112.



Bethlehem's settlement put actuaries of other steel companies on extra shifts last week. Cost is still a major unknown, along with details and the problem of how to fund a pension plan.—p. 113.



A lot of badly needed steel construction—schools, hospitals, institutions—has not yet begun to appear on the books of steel fabricators but the group is a lot more optimistic now than it was last June. Major gripe at their annual convention was the fierce price warfare going on in the structural steel field.—p. 115.

Coming Next Week



How Oldsmobile has employed induction heating in its forge plant for heating stock to forging temperatures, as well as the advantages and economies of the technique, will be described in the article, "How Oldsmobile Uses Induction Heat for Forging," appearing next week. Better die life, savings in raw materials, elimination of scale, ease of stock handling and cleanliness of operation are some of the advantages of this type of heating.

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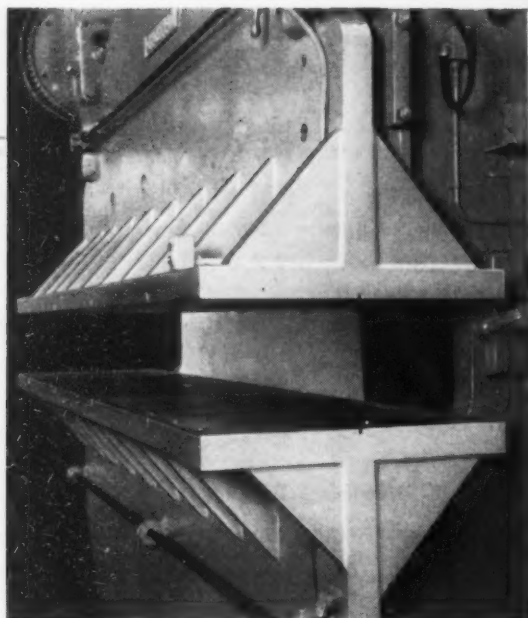
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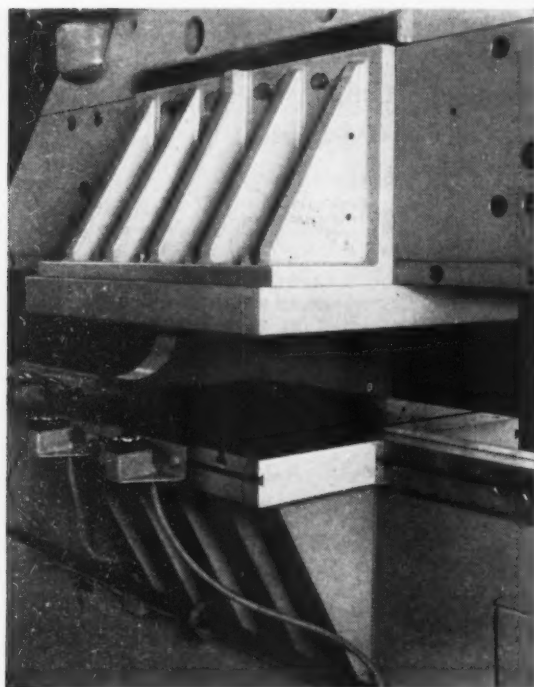
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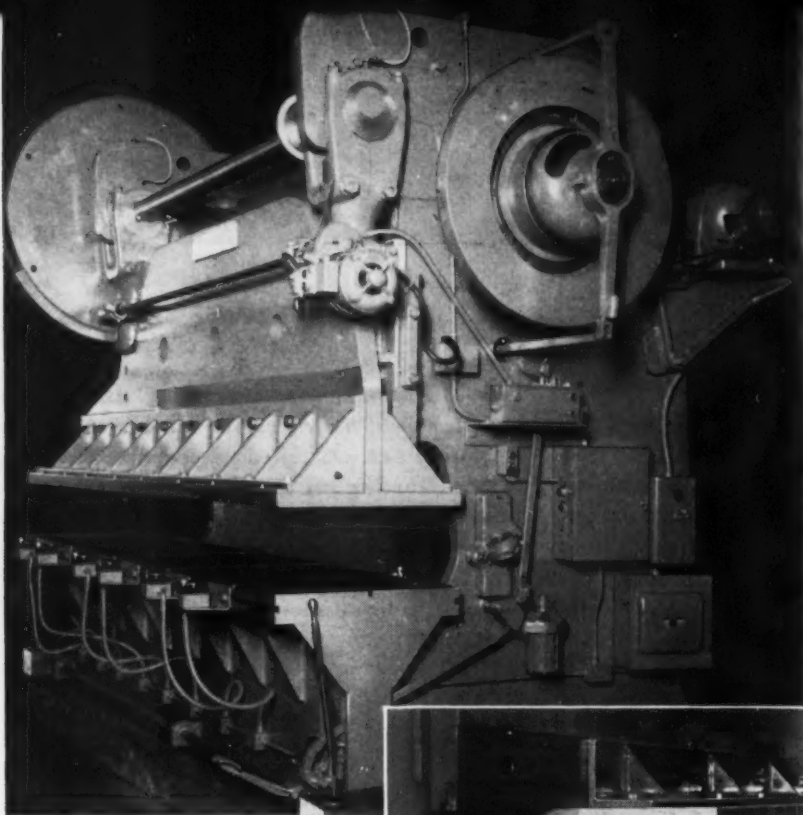
Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut and 56th Sts., Philadelphia 39, Pa. Entered as second class matter Nov. 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. \$8 yearly in United States, its territories and Canada; other Western Hemisphere Countries \$15; other Foreign Countries \$25 per year. Single Copies 35¢. Annual Review Number, \$2.00.



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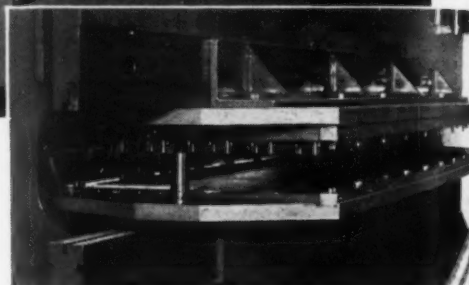


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Large area, removable upper brackets

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THE CINCINNATI SHAPER CO.

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Editorial

— I N D U S T R Y V I E W P O I N T S —

Who Pays For Pension?

THE steel industry has lost its fight for the principle of contributory pensions. The union is said to have won a smashing victory against steel people.

But it is far too early to say who won what. Some people think that steel companies and others who have to add new plans or enlarge existing ones will pay the enormous increased costs.

Others maintain that 50 million workers will now pay for supplemental pensions going to only a fraction of that number. Still others say that the consumer will pay the full cost of these newly granted pension plans.

These answers are too easy. They are only partially true. Business has not always passed on to the consumer the full cost of increased wage payments. It has and may still pass on part of such costs but there is a limit even to this. That limit may be close at hand. That was one reason why the steel industry fought so hard for a contributory pension.

Steel people will have higher costs. Some say \$3.00 a ton. It may be more. Steel firms may have to raise prices. If they do their customers will find they have to raise prices too—to partially pay for their own increased pension costs and for higher steel prices. And so on down the line. So the consumer may finally pay part of the new contracts being signed in steel and elsewhere.

But if this method is carried too far this country's ability to make more things for more people at the lowest price possible will get a setback. We don't think that will happen. These supplemental pensions must eventually be paid by more production per employee. The only way to get this is by a combination of harder work by employees and better techniques and more modern machinery.

Whether we will get harder work from employees as a result of more pensions is debatable. But we do know that business wants the free enterprise system with competition resulting in lower unit costs and greater sales volume.

The factors that will pay for the increasing number of social security packages are basically the same ones that have given America the highest wage rates and living standards in the world. Now these business aids must be quickly expanded if unit costs are to be reduced or kept in check.

Here are the most important ones: Prompt scrapping of old and obsolete machinery; adoption of latest techniques in production, handling, packaging promotion and selling; better training programs for management at all levels; and recognition that advertising is an important tool to insure success of production and sales programs.

Tom C. Campbell

Editor

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ORTON

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NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► About a fourth of the steel normally shipped from the plants of one of the large steel companies is bought on the basis of chemical analysis. In meeting these specifications some 17 pct of the heats are unsuitable, or off-heats. Any tendency to increase buying on chemical analysis or any tightening of specifications would drastically increase occurrence of off-heats and increase steel-making costs.

Of the balance of steel sold by this company, 22 pct is ordered on physical property specifications. Customers purchasing the remaining 53 pct indicate no particular specifications. They simply specify general product requirements: wire fencing, auto fenders, etc.

► A West Coast aircraft plant has just received a shipment of 1400 lb of ductile titanium sheets. This is believed to be among the largest, if not the largest titanium sheet shipment ever made, though it is reported that there are inquiries out for considerably larger amounts. No further details can be revealed at this time.

► Strike settlement has brought a change in at least one major auto company's plans for 1950 model change. Until last week its officials planned to shut down during the model change. Now they are figuring on a "running" model change. It will be touch and go as steel inventories are sub normal but they think they can make it.

► A mobile ice machine that will crush 5 tons of ice in less than 90 sec and charge it into the bunkers of refrigerator cars is now in operation on the Santa Fe Railroad. The entire operation is handled by one man who runs the machine from a bridge atop the electronically controlled mechanism which moves at 300 ft per min along the track of cars to be filled. At peak production the machine has served 660 cars a day.

► Steel consumers least affected by the strike were structural fabricators, except for those whose shops were struck. Those who were hit will come back faster than sheet users because finishing time is shorter and composition simpler on bars and shapes. But wide flange beams will be tight for some months.

As predicted here, Bethlehem began shipping steel on Nov. 2, a little more than a day after its strike ended.

► Friction of one metal surface sliding over another is not continuous but takes place in a series of small jerks, according to results of studies of autoradiograms. The studies permit determination of the influence of such factors as pressure, hardness of surface and effects of lubricants. For the study, piston rings and other engine parts have been made radioactive.

► Large production savings often turn up in unexpected places. An auto plant estimates an annual saving of \$100,000 has resulted from the use of a new method of eliminating leaks in compressed air lines. Another company reports more than a million dollars saving resulting from use of expendable containers for parts shipments.

► Business firms unfortunate enough to find themselves submitting identical bids on government contracts may be headed for trouble. Congressman Patman, D., Tex., head of the Small Business Committee, has instructed the federal departments and agencies to turn over to him all instances of identical bidding. Government procurement officials say there aren't nearly as many examples as there used to be, but there still are a "considerable number".

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Steel Loss Set at 10 Million Tons

Higher Prices Probable in 1950

Scrap Quotations Advance Again **IRON AND STEEL INDUSTRY TRENDS**

The Iron Age

SUMMARY

STEEL lost in the strike plus that which will be lost before production comes back to normal has now passed the 10-million ton mark. This means a steel shortage that may extend into next summer. The conversion deal has come back and the threat of gray markets looms again. On top of all this, higher costs in contracts signed so far may mean higher steel prices.

Chances are good that there will be no major steel price increases this year but they are a definite possibility for early 1950 unless demand goes to pieces. Most steel companies are reporting a downtrend in earnings. Higher labor costs under the Bethlehem pattern or any similar pact are variously estimated at a minimum of \$3 per ton of steel.

Smaller Firms May Raise Prices

If labor costs of the smaller steel firms are raised by strike settlements some individual price increases are certain. Many of the smaller firms were able to show a fair profit during the past few years because tight steel supply permitted them to charge prices above those of the major producers. Unless steel demand over the next few months proves a lot worse than industry sources predict, some overmarket prices are going to be posted by smaller volume mills whose unit costs are generally higher than those of the big firms. Many of the smaller steel companies are going to resist settlement on the Bethlehem basis. Since the union has not altered its industrywide attitude there will be some delayed openings and some bitter battles on this score.

Most metal consumers have not yet felt the full impact of the steel strike. But that blow will land this month and it will close down a lot of plants. The automobile cutback alone will pinch many smaller parts suppliers until December. Steel users who learned how expensive it is to operate off the tail gate of a truck are going to be sure their inventory is in fair shape before resuming full production.

Warehouse Stocks Going Fast

Warehouses are still under terrific pressure for steel but many of them have been practically

cleaned out of the tighter items. Most of them are fresh out of sheets. In popular sizes of cold-finished bars, such as 1-in. rounds, a few large Chicago warehouses report they have little or nothing left. Stainless steel sheets, particularly 24 and 26 gage, have been moving so fast that one large warehouse in Chicago has none left. Structural and bar shapes are hard to find in popular sizes and aluminum demand is brisk.

Warehouses are canvassing the mills to learn the exact status of each of their orders, some of which have been partially processed. As many warehousemen who had been unable to move tonnages of unusual grades and sizes now report that they have cleaned out much of this material and the expected loss has been turned into a profit.

Mills report that orders booked for oil country tubular products show a continuing strong demand, with customers placing requirements for the second quarter of 1950. Manufacturers' wire is being booked into the first quarter. Mechanical and pressure tubing demand is not too strong and merchant wire is off seasonally. Standard structural shapes will be on quota for at least a month after the end of the strike, wide-flanged structural shapes will be tight and on allocation for perhaps 4 months.

Steelmaking Scrap Market Strong

The steelmaking scrap market this week is hot. After showing enough strength last week to lift THE IRON AGE steel scrap composite by \$2 a gross ton, to \$27.58, it has again moved into new high ground for the current move. This week's gain means that this composite has moved from its June low of \$19.33 almost half way back to the January high of \$43 a gross ton. This week it stands at \$28.92 per gross ton, up \$1.34.

The steel ingot operating rate for this week is estimated at 22 pct of rated capacity, up 9.5 points over last week's revised rate of 12.5 pct. The gain is due to the fast return of furnaces at Bethlehem and at other plants that have settled their strikes and may be further revised if other units are brought in later this week.

The washer that grew from a saucepan



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STEEL CAP SCREWS get a bath in n. hydrochloric acid. The basket you see here is made of perforated Monel sheet, riveted and welded. It went into service over six years ago.

THESE CRADLE-TYPE CRATES have been on the job since 1942. Note their excellent condition. Photos courtesy of the fabricator, The Youngstown Welding & Engineering Co., Youngstown, Ohio.

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ment that must be designed for a special job can be readily fabricated from regular Monel mill forms (rods, bars, angles, etc.) Whatever its form, Monel is readily cut, bent, machined, forged and welded by ordinary methods. Welding doesn't reduce strength, toughness or corrosion resistance.

Remember all these advantages of Monel when a pickling problem has you stumped. Remember also, that experienced fabricators like THE YOUNGSTOWN WELDING & ENGINEERING COMPANY (who made the basket and rack shown above) can offer practical help in design and fabrication.

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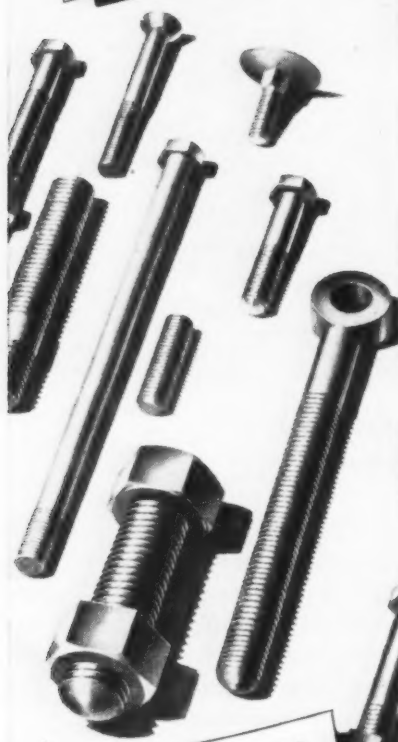
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Fatigue Cracks

By *Charles T. Post*

Business Barometer

Brig. Gen. Leonard P. Ayres, the late and eminent Cleveland economist, used to contend a decade or two ago that the blast furnace operating rate was the ideal stethoscope with which to sound the nation's economic chest. This was a fine thing for your favorite family journal whose count of stacks in blast was regarded as official long before varied other institutes and publications got into the business.

In those days, the iron tycoons liked to play their cards close to the vest and many deluded themselves into thinking that their blast furnace rate could be hid under a bushel. Thus, the forces of light, as represented by your f.f.j., found it necessary to build up a network of informers. This sounds sinister, but in actual practice a few minutes spent in a restaurant or saloon across from a mill brought the facts forth quickly enough, and the disciples of the Cleveland sage were served.

Some years later the theory was seriously advanced that the scrap price average at the principal buying centers was such a sensitive measure of business health that it could be used to chart the future course of the stock market. Articles were written, supported by numerous historical graphs, to prove that winning on Wall St. was as easy as turning to the f.f.j.

scrap price page and placing your securities orders accordingly. No one, to our knowledge, has completely discredited scrap prices as an omen of things to come businesswise, but the securities market has shown little inclination to tread the same road as the business index. The more astute stock market players soon found this out. They continued to follow the scrap price pages, but jumped into the scrap business themselves, to their immense financial betterment.

We haven't told a soul yet, but we have been boring a few test holes on still another feature of your f.f.j. which we feel may be an even more revealing finger in the economic wind. Our theory revolves around a close study of the photographs of the industry giants shown in "Iron Age Introduces," our immediate neighbor to the east. The portraits shown are those of men taking on new and bigger business responsibilities. If business prospects are cloudy, it stands to reason that there will be little sunshine in these faces, but rather grim determination. To the contrary, if prospects are bright and the profits curve bending upward, the new job has probably brought a raise, and the smile fairly lights the whole page.

Last week, we are happy to report, the outlook was favorable by a seven to five count.

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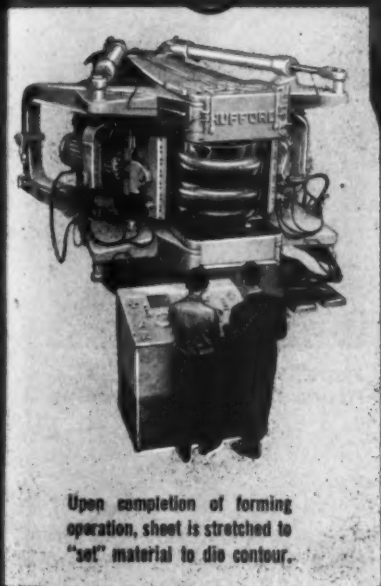
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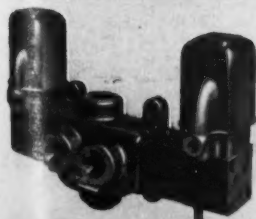
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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

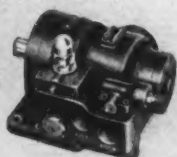
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4-Way Valve



Right Angle
Check Valve



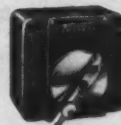
Two-Pressure Vane Pump



Rotary Pilot Valve



Relief Valve



Flow
Control
Valve



Lever Operated 4-Way Valve



Vane Type
Pump (Single)

Iron Age *Introduces*



MARK GARDNER, president, International Derrick & Equipment Co.



N. B. ORNITZ, manager foundry operations in Pittsburgh district, Blaw-Knox Co.



FRANCIS B. DUNN, manager Houston Works, A. O. Smith Corp.

Mark Gardner has been appointed president of **INTERNATIONAL DERRICK & EQUIPMENT CO.**, Cleveland. He succeeds **Oscar M. Havekotte** who has resigned. Mr. Gardner was also elected a director of **Ideco** and will make his headquarters in Dallas, where the company's headquarters are being moved.

G. L. Ringland chief engineer of the electrical department of **Norwood Works** of the **ALLIS-CHALMERS MFG. CO.**, Milwaukee has retired after 43 years of service. **F. M. Winterhalter** and **C. F. Cobb** have been appointed engineers in charge of a-c design and d-c design respectively. **E. K. Spooner** has been made insulation engineer and **I. C. Smith**, mechanical engineer. **W. T. Saveland** has been named assistant mechanical engineer.

N. B. Ornitz has been appointed manager of foundry operations for **BLAW-KNOX CO.**, Pittsburgh. Mr. Ornitz is a director and vice-president of the company, and assumes this new responsibility in addition to his other duties.

Arthur E. Franks has joined the Metals Research Dept., of **NATIONAL RESEARCH CORP.**, Cambridge, Mass., where he will be engaged in the development of new products and of high vacuum furnaces for metallurgical processing.

Arch Davis and **Robert L. Houston** were appointed special executives and **Jane Haislip**, executive assistant, of **I.B.M. WORLD TRADE CORP.**, New York, a newly-created subsidiary of International Business Machines Corp.

Francis B. Dunn has been elected manager of the **Houston Works** of the **A. O. SMITH CORP.**, Milwaukee. **C. W. Wheatley** has returned to the company's Milwaukee headquarters where he will resume his work on the general staff. He had been assigned temporarily to the task of building up the postwar management of the **Houston Works**.

John B. Depot has been appointed director of personnel for the new departure division of **GENERAL MOTORS CORP.**, Bristol, Conn. Mr. Depot was formerly personnel manager of the new departure plant, Sandusky, Ohio.

George C. Lichty has been elected assistant sales manager of **GERLINGER CARRIER CO.**, Dallas, Ore. Mr. Lichty was formerly factory representative.



WESLEY L. DINSMORE, district manager of New England territory, Chicago Vitreous Enamel Product Co.



WILLIAM L. DONALDSON, district manager of East Central States, Chicago Vitreous Enamel Product Co.



ARTHUR SMITH, JR., director of public relations, Dow Chemical Co.

Arthur Smith, Jr., has been appointed director of public relations of the **DOW CHEMICAL CO.**, Midland, Mich. **L. H. Woodman**, former director of editorial service, will directly supervise institutional publications and releases, while **Eugene E. Perrin** will supervise product promotion. Mr. Smith has been with the company for 12 years.

Otho B. Bruce has been appointed manager of the Jacksonville, Fla., district of the Replacement Tire Sales division of the **B. F. GOODRICH CO.**, Akron, Ohio. Mr. Bruce succeeds **Walter J. Haecker** who has left to go into business for himself.

J. Vincent Hackett, former vice-president in charge of new business of the **RIVERSIDE METAL CO.**, Riverside, N. J. has resigned.

Wesley L. Dinsmore and **William L. Donaldson** have been appointed district managers of the **CHICAGO VITREOUS ENAMEL PRODUCT CO.**, Cicero, Ill. Mr. Dinsmore, who has been a service engineer, has been assigned to the New England territory. Mr. Donaldson, who has been a service engineer has been assigned to the East Central States.

Thomas M. Belshe has been appointed vice-president of **LEAR, INC.**, Grand Rapids, Mich. Mr. Belshe is a member of the board of directors and Lear's Washington representative.

Thomas W. Martin has been elected chairman of the board of **ALABAMA POWER CO.** **James M. Barry** has been named president succeeding Mr. Martin. **Lewis M. Smith**, vice-president since 1945, was appointed general manager succeeding Mr. Barry.

Thomas K. Gregorius has been appointed plant superintendent of the **PITTSBURGH PLATE GLASS CO.**, Pittsburgh. He will succeed **James Green** who has retired. **Paul C. Lawson** has been appointed first assistant superintendent in charge of Duplate safety glass manufacture and **R. M. Haines** further as first assistant superintendent in charge of plate glass manufacture.

J. H. Goodspeed has been placed in charge of the St. Louis sales office of **TITAN METAL MFG. CO.**, Bellefonte, Pa. Mr. Goodspeed was formerly in the Chicago sales office of the company.

Robert A. Speck and **George R. Milne** have been appointed vice-presidents of **NATIONAL CARBIDE CORP.**, New York. Mr. Speck in charge of sales and distribution, Mr. Milne in charge of operations. **Russell T. Lund** has been named operating manager. **Astor Brown** has been made acting works manager at Ivanhoe, Va., and **Clarence G. Burnham** becomes controller.

E. N. Crosier has been appointed secretary and treasure of **SHARON STEEL CORP.**, Sharon, Pa. He succeeds **A. J. Watson** who has reached retirement age but will continue with the company as assistant secretary. Mr. Crosier has been with Price, Waterhouse & Co. for approximately 20 years and was a senior manager in the Pittsburgh office.

Paul Linz has been named chairman of the board of directors of the **SOUTH AMERICAN MINERALS & MERCHANDISE CORP.**, New York. Mr. Linz continues as personal assistant to Dr. Mauricio Hochschild in all his enterprises.

Frederick C. Crawford has been elected to the board of directors of **MERCAST CORP.**, New York. Mr. Crawford is president of Thompson Products, Inc.

Cecil Roy Pond has been elected sales representative in Birmingham for the **AUTOMATIC TRANSPORTATION CO.**, Chicago. Mr. Pond has been associated with the company since 1945.

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A note on Abrasives

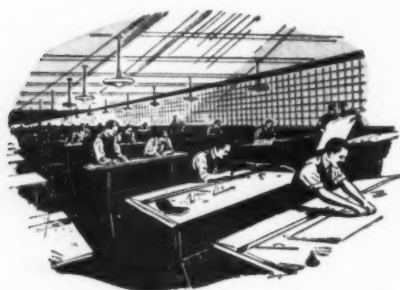
Improved Abrasive Tools help step up production...cut costs



New production efficiencies and economies are being realized almost daily as a direct result of technical advances in abrasive products. At The Carborundum Company these improvements do not just "happen." They are derived from a carefully formulated program. Product Development...an important activity here...pools specialized knowledge, experience and skill. It probes into the performance of present products...seeks

and finds possibilities for doing the job better. It examines and compares the action of bonded and coated products under every conceivable production condition. It studies and restudies technical advances in machines and methods. CARBORUNDUM'S development staff turns up ideas that can be incorporated into new products as well as better ways of using present products. Both are important to produc-

tion management. As a user of abrasive products by CARBORUNDUM, you receive the direct benefit of all advances in product development. This — together with abrasive engineering and other services — offers another reason for specifying and buying abrasive tools produced by CARBORUNDUM...the leading name in abrasives. The Carborundum Company, Niagara Falls, New York.



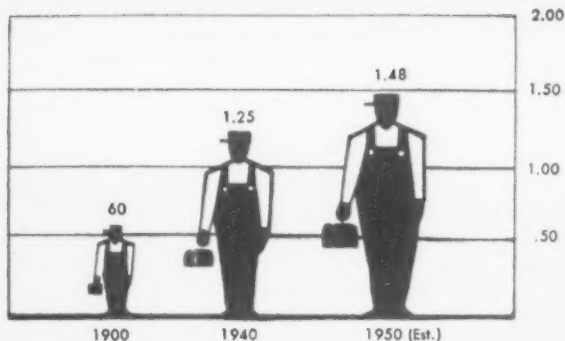
The only complete line of Abrasive Tools is

CARBORUNDUM

TRADE MARK

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

America's Future Prosperity depends on Higher Production per Man-Hour



The basis of our well-being has always been closely allied with the *value of goods an hour's work will buy*. As the chart shows, this value has increased from 60c worth of goods in 1900 (at today's prices) to an estimated \$1.48 worth in 1950. This value is bound to increase, and smart manufacturers know that *their* prosperity as well as the country's, depends upon their ability to produce more goods per man-hour expended.

here's how one manufacturer
boosted production per man-hour

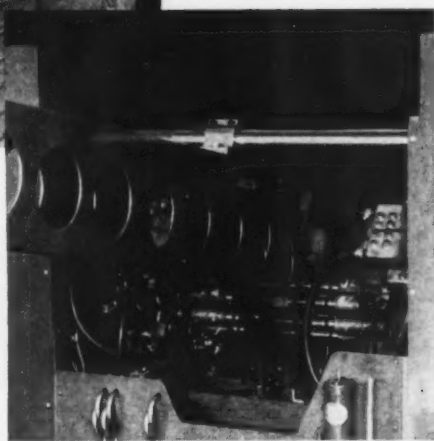
eight times!



One of the world's largest producers of wheeled toys was faced with the problem of speeding up assembly of wheels. The assembly involved fastening two stamped wheel halves with 8 spot welds.

Instead of purchasing additional welders, training new operators and taking up valuable floor space, a special *multiple welder* was designed and built by Sciaky. The operator has only to load the gravity feed chute, press starting switch and then keep chute full. Finished wheels drop out the other side at the rate of 30 per minute!

Thus, only one operator welds more than 8 times as many wheels as formerly produced. Here is an instance where skilled use of resistance welding greatly *increased production and decreased unit cost*. For a complete description of this machine write for Bulletin No. 25C.



Sciaky specializes in both a complete line of standard welders, and in the design and manufacture of special units, tailored to your needs. You are invited to consult our Application Department without obligation.

SCIAKY

THREE-PHASE

Pioneers and Inventors of **THREE-PHASE** Resistance Welding Equipment

SCIAKY BROS., Inc. • 4915 WEST 67th ST. • CHICAGO 38, ILL.



GLOBAL LETTER

REVIEW OF WORLD MARKETS

British public regards economy measures of government as too puny . . . Brazilian government seeks new loans . . . French iron and steel exports increase.

London—Mr. Attlee's cure for Britain's financial ills, announced to the nation on Oct. 24, has not been well received. Perhaps this is all to the good, for the criticism directed against him is not that he has been too drastic, but that he has not been drastic enough.

This does at least show that the public is alive to the situation. There had been a big build-up in the press prior to the announcement. This will hurt, people were told. The country is spending more than it can afford. There will have to be cuts in expenditure; there must be increased production for no more pay. "Wait till next Monday" became a typical quip in the week preceding the Premier's speech.

Government Cuts Expenditures

Although the people were prepared for something really nasty, they got little more than a reiteration of unpleasant facts, and an announcement of measures which it was felt would go only a little way towards resolving the crisis. Prime Minister Attlee announced a government program intended to have a total disinflationary effect of \$700 million a year. Biggest

cuts are to be made in capital expenditures, defense, government departments, adjustment of food prices and lifting of subsidies.

These "distasteful" proposals, Mr. Attlee declared, were necessary and consequential on devaluation, which had given the country "maybe the last opportunity of restoring our position as a trading nation without a drastic lowering of our whole standard of life." He called for harder work, longer hours and further restraint in personal spending and income demands.

Economy Measures Ordered

It is hoped that the rate of saving of £140 million per year on capital investment will become effective by the second half of 1950. Substantial contributions will come from the fuel and power industries, housing and miscellaneous investment. There will be a tightening of building controls. Industry awaits further details of these proposals, and also of the effect of import cuts on raw material supplies.

Scarcely a newspaper commented favorably on the Prime Minister's speech. Generally, the

criticism was that he had taken not the promised axe, but a pruning knife to the spending departments.

Stock exchange reaction has been distinctly unfavorable. Prices of government stocks have fallen, in many cases to new lows, and a great play is being made with a statement in the financial columns of one of the conservative papers that more than £1110 million has been wiped off the prices of gilt-edged securities since the Socialists won the 1945 election. This is more than the American loan to Britain.

Opinion is that more cuts will be made. It is understood, however, that a new list of cuts, which would probably involve major policy changes, is not likely to be issued unless trade goes badly against Britain.

Brazilian Government Expects New Bank Loans

Sao Paulo—Messrs. Richard Demuth, Harold Larsen, Newton Parker, Sydney Wheelock and Tracey Martin, representatives of the International Bank for Reconstruction, are now in Brazil studying the projects the Brazilian government hopes to carry out with financial assistance from the bank. The mission has been visiting Minas Geraes, where the local administration expects to obtain a loan for the purchase in the U. S. of machinery and equipment for agriculture and industry, material for state railways and for the

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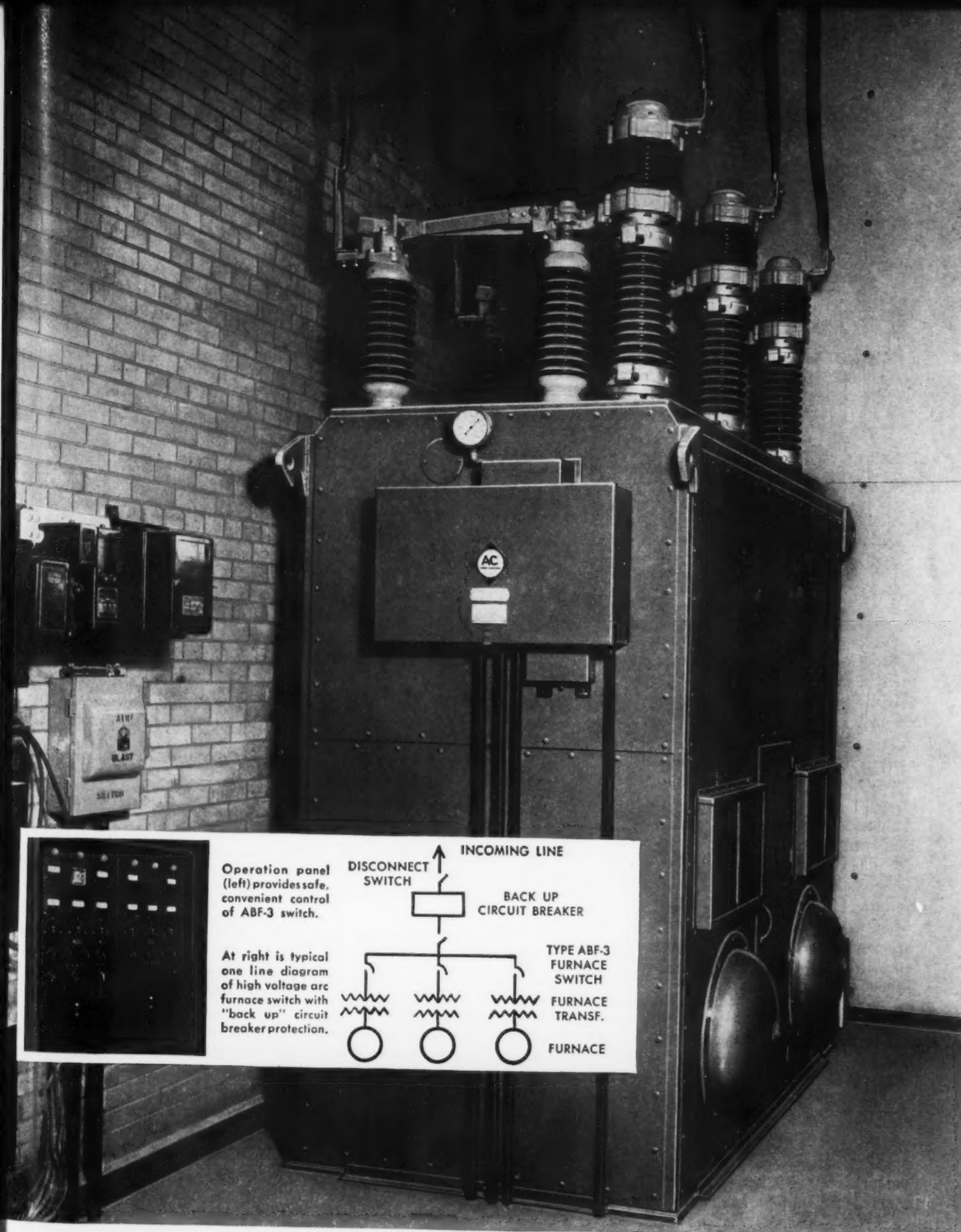
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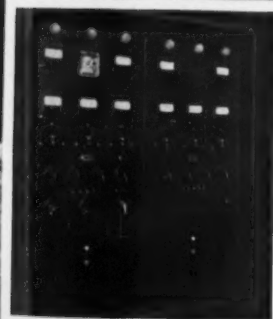
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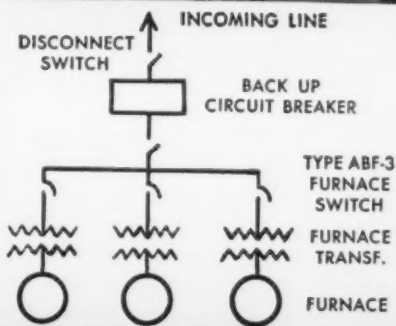


UNIVERSITY OF MICHIGAN LIBRARIES



Operation panel (left) provides safe, convenient control of ABF-3 switch.

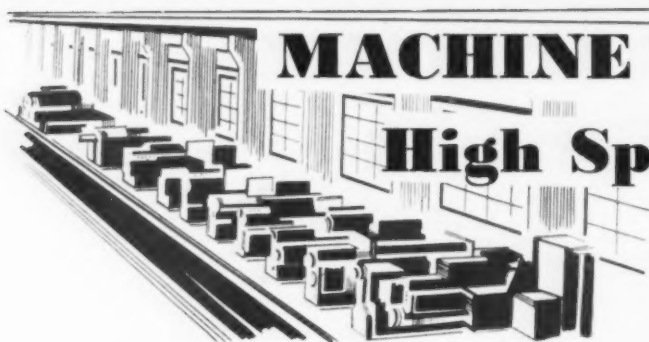
At right is typical one line diagram of high voltage arc furnace switch with "back up" circuit breaker protection.



CHALMERS



POWER, ELECTRICAL
AND PROCESSING
EQUIPMENT FOR
IRON AND STEEL



MACHINE TOOL

High Spots

Sales
Inquiries
and Production



by

William A. Lloyd

Upturn in new orders . . . Two weeks delivery on some machines . . . Auto producers request quotations.

Cleveland—An immediate upturn in new orders was predicted this week by spokesmen for major segments of the machine tool industry as settlement of the steel strike, following Bethlehem Steel Co.'s move, was slowly taking shape.

Simultaneously, it is expected that during the next 6 or 8 weeks, the machine tool industry will get some of the business that has been pending for the past 6 months, when firms begin cleaning up 1949 appropriation money. This was a sizable market factor in the closing weeks of 1948.

Some Business May Be Lost

On the other hand, a certain amount of business is pending that the industry may never get. Some of it has been held up because of a lack of cash, and with pensions and their payment in the present uncertain state, small companies may be reluctant to make additional capital goods purchases for several months.

Many producers of standard, general purpose machines are in a stock condition at the present time, and can make delivery of almost anything in their various lines within 2 weeks. It follows

that companies having quotations on machine tools and not operating as a result of coal or steel shortages, are not sending in their orders because they know delivery will be made within a month, and the outlay of cash with nothing coming in is a definite deterrent.

Market Remains Steady

While some observers are of the opinion that the industry suffered about a 20 pct drop in new firm orders during October as a result of the strike, the general tone of the market has remained fairly firm in several sectors, including Detroit, Cleveland and Pittsburgh. Demand has tapered off to some extent in Cincinnati, although heavy machines are moving. Demand for small tools is in what appears to be a temporary decline.

In Detroit, indications are growing that there will be several substantial tooling placements for new car engine programs during 1950. The new engines, in some instances, will be available for 1951 models.

More requests for quotations on tooling for a new Chrysler high compression engine were reported this week. It now seems likely that

few, if any, placements will be made before the end of the year. Some additional tooling orders for Dodge and Lunch Road have been reported, however.

Requests Engine Quotations

Requests for quotations have also been reported for a new engine for Studebaker and Ford. These programs are in the very early stages. It is probable that many changes in the present programs will be made before actual placements are received.

A few requests for quotations have been received from Kaiser-Frazer, it is reported, but there are no indications yet of major tooling decisions that have been anticipated since K-F received its \$34.4 million loan from Reconstruction Finance Corp.

There have been some recent minor changes in Packard's ultramatic transmission tooling, it is reported. Incidentally, it now appears that the new Packard transmissions will be widely offered by Packard dealers in the near future.

Forecasts Rising Sales

In Cleveland, L. D. McDonald, vice-president of Warner & Swasey Co. and president of National Machine Tool Builders Assn., forecast a rising sales curve for the machine tool industry.

Speaking before the district managers of Warner & Swasey Co., Mr. McDonald said peacetime competition in all industry and the return of buyers' markets generally were provided a solution to the problem of war surplus machine tools.

"Up to now, the nation's metal-working plants have been operating for the most part with older machine tools which are out-produced by today's models.

"More than half the plant equipment in place today was built prior to the war and much of the remainder is of wartime vintage representing engineering designs frozen almost 10 years ago."

Mr. McDonald said there would be an upward trend in machine tool sales today if it were not for the hesitation due to the current strike situations in steel and coal.

Angular operations at low cost

Throttle body - 33 operations from 13 directions 4-4/10¢

1st chucking

150 drill
10-24 NC tap
2 holes

332 drill
3/8-24 NF tap

375 drill
4 holes

mill slot

180 drill

face

2nd chucking

422 344
step drill
2 holes

213 drill
1/4-28 NF tap
4 holes

180 drill

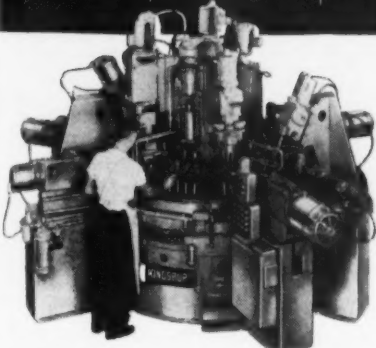
mill end

156 drill
2 holes

spot

120 drill
2 holes

3.28



310 PARTS AN HOUR GROSS. This 60-inch indexing machine operates 32 tools in 2 chuckings. It has 14 automatic units that point in these 9 directions:

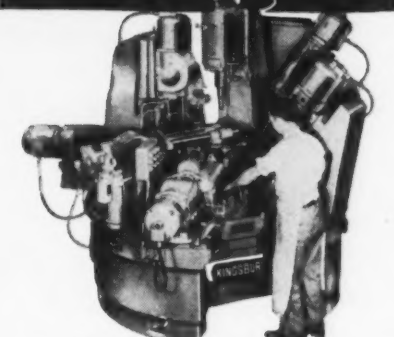
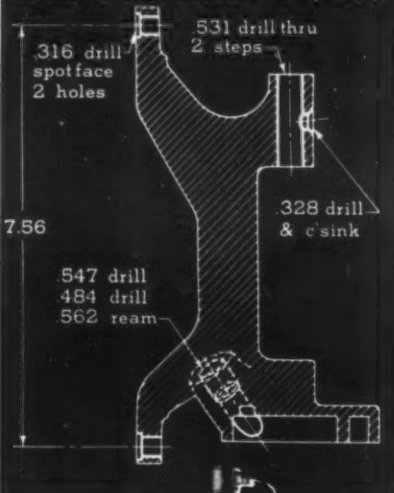
- On the central column—
 - 2—vertical*
 - 1—10° off vertical, 13° left
 - 1—10° off vertical, 13° right
- On angular columns—
 - 2—29° off vertical, 32° left
 - 1—15° off vertical, radial*
- On knees attached to the base—
 - 1—8° off horizontal, radial*
 - 4—horizontal, radial*
 - 1—horizontal, 26° left
 - 1—horizontal, 26° right

(*These operate on both chuckings.)

- Six of the 14 units have multi-spindle auxiliary heads.
- Bushings guide all drilling, butt milling and spotting tools.

- One end mill performs 2 operations—faces the right side, 1st chucking, and mills the left end, 2nd chucking. The operator can adjust for cutter wear.
- The .180 hole in the center of the slot is drilled at an angle from both ends, one per chucking. Both chuckings locate on the throttle bores so accurately that the hole is straight.

Pump body - 10 operations from 4 directions 3-3/10¢



200 PARTS AN HOUR GROSS. This 20-inch indexing machine operates 10 tools from 4 directions in 1 chucking.

- Two vertical units drill the .531 hole in steps to keep the output up.
- Three units on angular columns drill and ream the .562-.484 hole.
- Two 2-spindle horizontal units drill and spot face the two .316 holes.
- One horizontal unit operates a combination .328 drill and counter-sink from the rear across the index table.

KINGSBURY

AUTOMATIC DRILLING
AND TAPPING MACHINES
for Low-Cost High Production

Drilling and tapping units operate here from 4, 5 or 8 directions per chucking

Dear Sir:

These machines use automatic drilling and tapping units mounted —

- on vertical columns
- on angular columns
- in angular adapters
- horizontally and radially
- horizontally off the radial line
- on the other side of the index table.

One Kingsbury operates on a throttle body from 13 directions in 2 chuckings. The other machine operates on a pump body from 4 directions in 1 chucking. That is one advantage of using independent drilling and tapping units.

Other advantages

Independent units also make possible:

Closer tolerances. We can locate the spindle to exact indicator readings.

Proper feed. Single-spindle units perform operations requiring different feeds. (For operations of similar size and depth, units with multi-spindle heads are more economical.)

Changes in hole location. You can relocate these units without too much trouble.

These unit costs are low

For all 32 operations on each throttle body, man and machine cost 4-4/10¢. For all 10 operations on each pump body this cost is 3-3/10¢. Here is the basis: a high wage rate, 80% efficiency and the cost of the entire machine amortized over 6000 hours, a fraction of its profitable life. (No power or overhead.)

Where unit costs were high

Once upon a time a friend of ours saw several Kingsburys in a plant far from any of our dealers. A lot of men stood by each machine. One loaded and unloaded parts. The others tripped the units after the table indexed. "Don't these units have an air trip control?" he asked. They did. In an hour or so he had all the machines running properly. That night company officials wine and dined him. He had no idea how long the party lasted.

Your unit costs can be low

If you do operations such as these on high production parts, a machine that combines operations is a good bet (at least if you see the instruction manual). To prove it, let us make you a proposal. Just send a print to our Mr. L. A. Carll. Tell him the operations and hourly output you need. Or ask him for free bulletins that show 40 setups.

Sincerely,
Kingsbury Machine Tool Corp.
30 Laurel St., Keene, N. H.

FREE

USE POST CARD

PUBLICATIONS

Controlled Gas Furnace

The performance history of batch-type controlled atmosphere furnaces demonstrating cost saving advantages of gas v. liquid cyaniding are described in 4-p. booklet. *Dow Furnace Co.* For more information, check No. 1 on the postcard.

Lubrication Guide

A new 14-p. lubrication guide for tractors, trucks, buses, and other equipment lists 9 different Motul lubricants and their specific uses. *Swan-Finch Oil Corp.* For more information, check No. 2 on the postcard.

Boring Tool Holders

Boring tool holders, for attachment to lathes, that offer accurate vertical adjustment are featured in an illustrated 4-p. catalog. *Bokum Tool Co.* For more information, check No. 3 on the postcard.

Precision Spindles

Illustrated bulletin S-3 describes precision spindles having super precision roller and thrust bearings for extreme radial and axial rigidity. *Pope Machinery Corp.* For more information, check No. 4 on the postcard.

Flexible Hose

Resinous-lined, reinforced flexible industrial hose for standard and special installations where it is necessary to convey liquids, lubricants, gases, and for trans-

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

mitting oil or air hydraulic power through flexible lines is described in 4-p. pamphlet. *Resistoflex Corp.* For more information, check No. 5 on the postcard.

Inspection Instruments

Three new optical inspection instruments—a 40 to 60-power pocket microscope, a 20-power Handiscope, and a Magniprox desk magnifier—are illustrated in two data sheets that contain specifications, prices, and operating information. *Buhl Optical Co.* For more information, check No. 6 on the postcard.

Power Shears

A new line of high speed power shears for light gage metal is described and illustrated in bulletin 71-I. *Niagara Machine & Tool Works.* For more information, check No. 7 on the postcard.

Lathe Carriage Spacer

The Harper combined lathe carriage spacer and micrometer stop, described in data sheet, fits all lathes, can be attached or removed in 5 sec, and is adjustable by .001 increments from 0 to 6 in. It saves from 3 to 10 min on every job re-

quiring a carriage stop. *Ellwood Products Co.* For more information, check No. 8 on the postcard.

Centrifugal Pumps

B & G series 1510-1515 centrifugal pumps are detailed with cross-sections and specification charts in 16-p. booklet. Installation and operation procedures are also included. *Bell & Gossett Co.* For more information, check No. 9 on the postcard.

Hydraulic Power Tools

Portable hydraulic power equipment, such as knock-out punches, rigid pipe benders, thick and thin-wall conduit benders, and electrically driven hydraulic pumps for installing pipe and conduit are featured in illustrated bulletin 50-B. *Blackhawk Mfg. Co.* For more information, check No. 10 on the postcard.

Pyrometer Indicators

Catalog 25 introduces line of thermo-electric multiple-point pyrometer indicators for temperature measuring operations in chemical processes, pilot plants, heat treating, power plants, plastic molding, diecasting, and aircraft

Turn to Page 158

You can depend
ON . . .

"OPERATIONAL EXPERIENCE"

FOR ALL
LEWIS PRODUCTS

The design-engineer of rolling mill equipment should know rolling practices and problems from A to Z. It's the *operational experience* Lewis engineers possess that determines the design of Lewis Rolling Mills and related machinery ... Results—Simplicity, Productivity and Economy of maintenance.

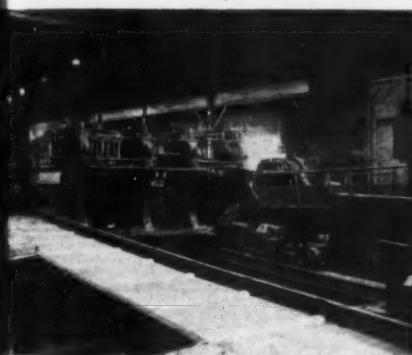
We welcome the opportunity to discuss ways and means of increasing your capacity and profits.



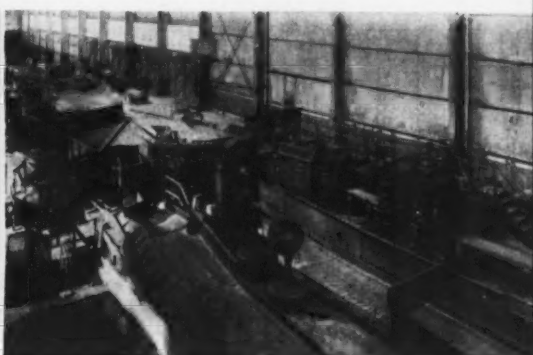
Setup Stands for
LEWIS 17 Stand Rod Mill installation



LEWIS 3-High Jump Mill and Tables

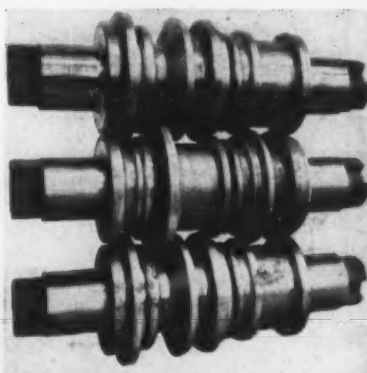


LEWIS Bar and Structural Mill Stand



LEWIS 17 Stand Rod Mill
view at finishing end

LEWIS Superior "X" Rolls ▶



LEWIS

ROLLING MILL EQUIPMENT

LEWIS FOUNDRY & MACHINE

Division of Blaw-Knox Co., Pittsburgh, Pa.

Designers and Builders of Rolls and Rolling Mill Equipment

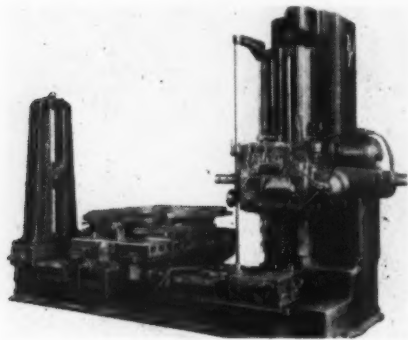
- BEDS — Cooling
- BLANKS — Gear • Pinion
- BOXES — Coupling
- CASTINGS — Rolling Mill
Furnace
- COILERS — Ferrous and Non-
ferrous Strip
- GEAR DRIVES
- GEARS AND PINIONS —
Bevel • Double Helical •
Single Helical • Speed Reduc-
tion • Spur
- HOUSING PINION — Rolling
Mill
- LATHES — Roll Turning
- LEVELERS — Roller for Plate
and Sheet
- MACHINERY — Special •
Flaking Mill • Rolling Mill
- MACHINES — Pickling
- MANIPULATORS — Rolling
Mill
- MILLS — Aluminum Foil • Bar •
Billet and Blooming • Brass
and Copper • Cold Rolling •
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• Plate Rolling • Precision •
Sheet and Strip • Slabbing •
Three-High • Tin Plate • Uni-
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- ROLL RAGGING ATTACH-
MENTS
- ROLL POLISHERS
- ROLLS — Alloy Iron • Chilled
Iron • Sand and Chilled Iron
• Steel
- SAWS — Hot and Cold
- SCREWDOWNS — Motor
Operated • Hand Operated
- SHEARS — Alligator • Bar •
Billet • Bloom • Continuous
Automatic • Sheet Mill • Gate
or Guillotine • Lever • Plate •
Power Driven • Scrap • Vertical
- STRAIGHTENERS — Angle
• Bar • Rails and Shapes
- TABLES — Blooming Mill •
Rolling Mill Feed • Transfer
for Mills

NEW

PRODUCTION IDEAS

Continued

working surface of 44 in. diam or 44 in. square, and is surrounded by a coolant trough. The table top is graduated in $\frac{1}{2}$ degrees and can be equipped with precision indexing

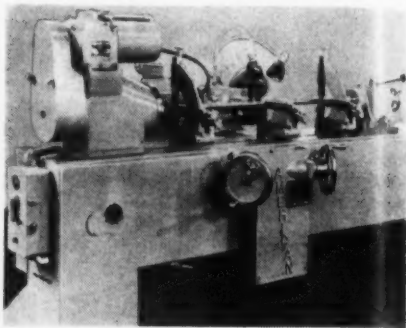


device. The table can be hand or mechanically revolved. The spindle head, column, bed and saddle and the boring bar support are standard units. *Cincinnati Gilbert Machine Tool Co. For more information, check No. 29 on the postcard on p. 35.*

Broach Sharpener

Reconditioning round broaches to their original accuracy can be accomplished on a broach sharpening machine that incorporates the principle of rotating the broach between fixed centers on a rigid table and positioning the grinding wheel from tooth to tooth. The grinding wheel spindle is mounted on a carriage that is laterally traversed the table length on rails. Micrometer dial controls for positioning the grinding wheel to the broach and infeed of the grinding spindle are placed on the front of the carriage. Other features include variable speed drive for the rotation of the broach; anti-friction bearing rollers and hardened and ground carriage mounting rails. Two models are available: the RBS-9-84 for broaches up to 9 in. diam and up to 64 in. long and the RBS-9-60 for broaches up to 9

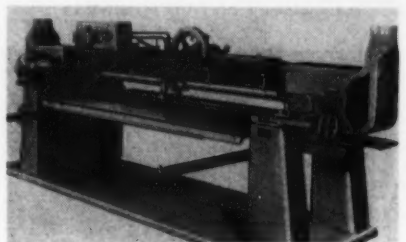
in. long and up to 60 in. long. Internal broaches such as involute and helical splines, hexagon, cam shaped, irregular formed, serra-



tion and combination type can be resharpened. *American Broach & Machine Co. For more information, check No. 31 on the postcard on p. 35.*

Hydraulic Stroke Sander

The new 43R1-DB double reversible belt, hydraulic stroke sander is a heavy duty, super-speed production polishing and sanding machine. Speed of the double, hydraulic-driven head is infinitely variable up to 250 strokes per min. A non-



stop stroke adjustment permits automatic adjustment lengths from 16 in. to 8 ft without stopping the machine. The two belts, each driven by its own motor, are independently reversible and may be used interchangeably without stopping the machine or removing the work from the table, permitting rough and finishing operations in one setup. Operational controls are grouped on a compact panel. *Curtis Machine Div., Lincoln Park Industries, Inc. For more information, check No. 32 on the postcard on p. 35.*

Diecasting Machine

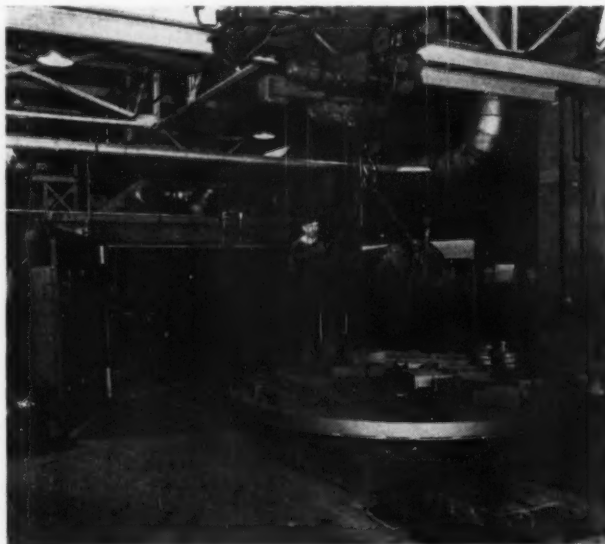
The new Model 50 diecasting machine, a small, rugged, low cost machine that retains features of the models 200 and 400 machines, is a high pressure hydraulic machine equipped with a Vickers two

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Blast Cleaning Room

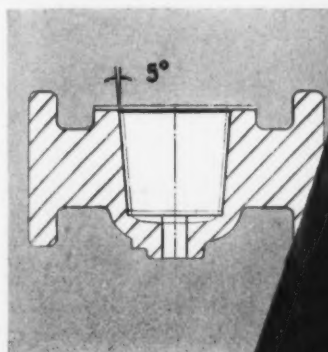
The new Rotoblast room provides airless, centrifugal-type blast cleaning for large castings, forgings or fabrications where size requires cleaning in room-type structures. Rubber-lined steel blast rooms, available in various sizes, are served by two standard Rotoblast units and an abrasive separator that cleans the metal abrasive and returns it to the Rotoblast units for re-use. A power-driven car that facilitates loading and unloading large castings, enters the blast room on its own track, and is equipped with a revolving 100 ft diam work table. This revolves at adjustable speeds of 4.3 to 13 rpm

to expose all sides of the castings to the impact of the blast stream. A single worker can run the entire cleaning room. The new machine will clean individual parts weighing from 1 lb up to more than a ton. *Pangborn Corp. For more information, check No. 30 on the postcard on p. 35.*



Sizable job... and the Tooling that does it...

Four sizes of steel valve forgings machined on one P & J Automatic—each size having the 5° taper cut shown below, and nine other close-limit operations.



on the P&J AUTOMATIC

POTTER & JOHNSTON'S tool engineers generally take difficult tooling problems in stride, but this one was a challenge. First of all, the job was big — four different sizes of valve forgings with a mass of steel to break down for the 5° taper, plus nine more exacting operations on each one to close accuracy limits. One master tooling setup plus three sets of chucking fixtures did the trick.

P&J's wealth of experience to engineer a sequence of toolings with an eye toward economy. P&J Tooling is the natural team-mate for any of the versatile P&J Automatics — in this case the 6DS. It's a combination that really works, with all the economy-advantages of precision, speed and low-cost operation. We can show you dozens of examples.

P&J economy tooling licked all four jobs on one P&J 6DS Automatic Turret Lathe.

The perfection of this job can be attributed to

Potter & Johnston Company

Pawtucket, R. I.

subsidiary of Pratt & Whitney
Division Niles-Bement-Pond Company



An estimate from Production Tooling Headquarters on your sample parts or prints may be the profitable answer to your quantity production problems. Write us for recommendations, and for the Catalog on the 6D series of P&J Automatics.

UNIVERSITY OF MICHIGAN LIBRARIES

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Search to reduce production costs getting results for the auto industry . . . Professional stylists debate the issue of annual model changes . . . "Speed Nuts" finding increased use.



by

Walter G. Pottner

Detroit—Die castings have replaced steel stampings for a number of important automotive applications. *Automobile Facts*, published by Automobile Manufacturers Assn., reports 400 automobile parts are now being die cast. Most of the die castings are zinc base alloys but the number of aluminum base die castings is increasing. Aluminum castings are often specified for important components of automatic transmissions.

Production Savings Made

Here are some examples of production savings made possible through the use of die castings: A car horn that required four steel stampings was replaced by a two-piece die casting, saving 28¢ per horn.

A die casting is being specified in place of stainless steel for the molding on the instrument panel of another car. The chrome plated zinc die casting save 2½¢ per car.

Tailgate latch assemblies for station wagons, formerly made of cast iron, are now chromium plated die castings. The resulting savings is 5½¢ each.

Another important trend in modern automobile production, according to AMA, is the increased number of dies required to build a car. One automotive firm, for example, reports it is using approximately 1200 dies for each of its various makes of cars. This is about 300 more dies per car than were required before the war, it is reported. Actually, modern car designs require more individual stampings, auto engineers say.

Die Costs Are Higher

Die costs, of course, have increased substantially since the war. Wages for skilled hand operations on dies have advanced appreciably. Die designs are often more complicated than pre-war dies. In addition, auto engineers require greater accuracy in their dies. They often specify automatic ejection devices which naturally increases die costs. The cost of a set of fender dies may

hit \$300,000 for some modern designs.

One of the larger elements of die cost is the expensive finishing operations required. Dies are finished by skillful grinding and hand stoning. A single roof die will sometimes require the full time work of 24 men for periods as long as 3 months, AMA reports.

It is surprising to many to learn that 4 or 5 individual dies may be necessary to produce the top of a car. One motor car producer employs five presses to make a roof. One of these presses is a triple action press which trims, flanges and restrikes. Restrike dies are often required in modern designs to sharpen the edge of a part after other press work has been done. There are also a number of applications in which separate stampings are welded together.

Professional Stylists Debate Annual Model Changes

The controversial question of automobile styling came out in the open recently at sessions held here by up-and-coming American Society of Body Engineers. Instead of customers, too often carrying a personal grudge or lacking real knowledge of the industry's problems, professional automobile stylists and other in-

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formed experts took a swing at the industry. It was all in good clean fun and even automobile engineers will admit some of the punches came pretty close to home.

Carl W. Sundberg, of the firm of Sundberg & Ferar, took the auto industry to task for its annual model changes which he considers a "pitfall" for modern car designers. Mr. Sundberg charged that annual styling changes lead to "corned-up, overdone" products, a sentiment which has previously been expressed by other not-too-ardent admirers of the industry.

Stylists Also Disagree

Mr. Sundberg felt that things like tail lights and license plate brackets are becoming too much the center of attention. While admitting that chrome has its place, Mr. Sundberg assailed its excessive use. Another prominent auto stylist, Don Mortrude, took an almost precisely opposite stand. Mr. Mortrude argued for more individuality in cars and significant design changes when they are made. He believes dramatic styling changes *every year* would help to level out the industry's depreciation pattern.

Mr. Mortrude wants lower and shorter engines. He also advocates improved cooling methods that will permit extensive front-end design changes.

Designers and builders of automobiles have one thing in common with baseball umpires: Everybody is ready, anytime, to take a swing at 'em.

Speed Nuts Reduce Costs

The use of "Speed Nuts" to join automotive parts has increased significantly in recent years although few outside the industry appreciate the extent to which automotive producers have cut their production costs by this means. George A. Tinnerman, vice-president of Tinnerman Products Corp., Cleveland, told American Society of Body Engineers about the use of "Speed Nuts" last week, emphasizing the large savings in material handling expense made possible by these unique fasteners.

As an example, Mr. Tinnerman showed that one car producer was able to save 48.2¢ per car through the use of 16 self-retaining fasteners to join the rear fenders to the body. The direct material savings, Mr. Tinnerman pointed out, was

5.58¢; the balance or 42.62¢ (88 pct of the total saving) resulted from reduced handling costs and overhead.

Emphasizing further the large potential savings in materials handling made possible by the use of self retaining fasteners, Mr. Tinnerman pointed out that a savings of 54.707¢ per car resulted from the use of special fasteners for eight applications on a car. Of this amount 60 pct of the savings, according to Mr. Tinnerman, resulted from the elimination of materials handling expense.

First Packard Employee Honored

Edward D. Jones, 70, the only active member of the small group of employees who built the first Packard car 50 years ago had a pleasant surprise recently.

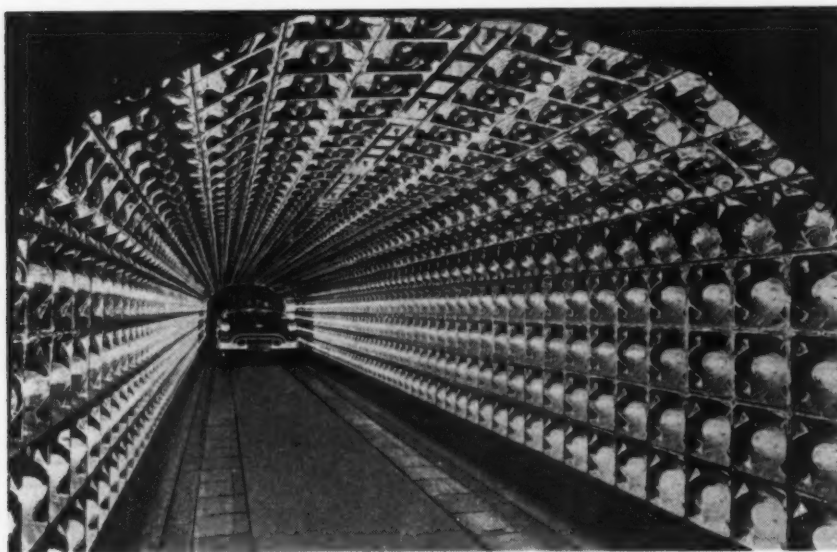
On Nov. 3, Mr. Jones completed 50 years of service with Packard. At 11:30 that day he was presented with the keys to a Packard DeLuxe Eight. Packard employees from all over the plant witnessed the presentation. Immediately afterwards Mr. Jones was guest of honor at a luncheon with George T. Christopher, president and general manager, and other Packard executives.

Mr. Jones joined Packard on Nov. 6, 1899, in Warren, Ohio. He moved to Detroit in 1903, and later became a trouble shooter working out of the factory. In 1919 he joined Packard service parts department where he still works.

Standardize Transmission Fluids

Ford and General Motors have joined hands in a program to standardize fluids for automatic transmissions. Both Ford and GM engineers have warned that the use of engine oils or inferior substitute fluids can result in costly service failures in automatic transmissions. These failures, it is pointed out, are not always immediately apparent and the initial experience with an inferior fluid may give the motorist a false sense of security.

MODERN AUTO BAKING OVEN: Shown in the photograph is a 1949 Oldsmobile entering a tunnel of infra-red lamps in the new final assembly plant of Oldsmobile Div. of General Motors at Lansing. A total of 1296 lamps rated at 250 w output, heat the metal of the car to approximately 200°F, thereby baking the paint "from the inside out." Flush-floor type conveyers are employed. The new Oldsmobile final assembly plant will be completed in December. Capacity is 80 cars per hr.



TUNE IN "SUSPENSE!"
CBS RADIO NETWORK THURSDAYS
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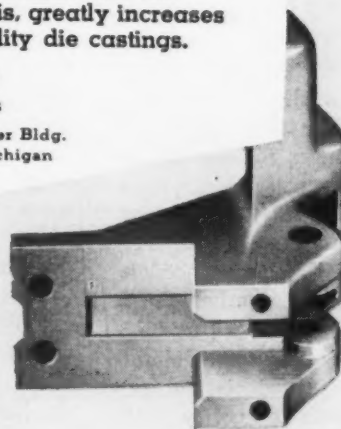
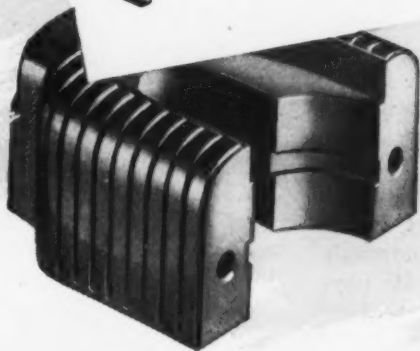
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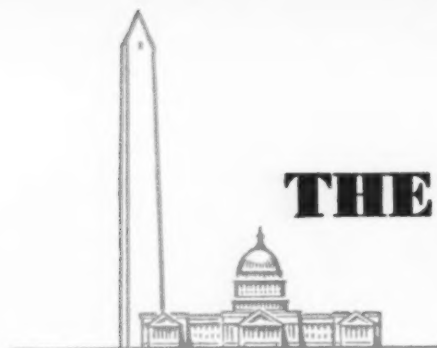
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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Congress will study depreciation allowance policies next year . . . Munitions Board setting up a well-documented Central Security File . . . Patent law amendment proposed.



by

Eugene J. Hardy

Washington — The much-buffeted depreciation allowance policies of the Bureau of Internal Revenue are almost certain to come in for closer Congressional scrutiny next year. First evidence of keener Congressional interest in this subject comes from the Joint Economic Committee which is currently conducting a study of factors affecting the stability of private investment. Hearings on this subject will open early next month and depreciation tax policy, particularly its impact on investment, will be given considerable prominence.

But while Congress will take a closer look into business complaints regarding depreciation allowance policies, the chances for any action to change these policies are not good. As a staff study, released by the Joint Committee, points out, "in the face of the budget deficit for 1949 and the contemplated deficit for 1950 (estimated at \$5.5 billion), it hardly seems feasible at this time to introduce radical changes in depreciation policy . . ."

Congress Will Not Act

Congress is definitely not going to undertake any proposal which would mean a substantial loss in

federal revenues. For example, it has been estimated that under-depreciation of assets during the last 3 years amounted to about \$12 billion. Had such an amount actually been deducted from income, revenues would have been reduced by \$4.56 billion (figured at 38% of \$12 billion, this percentage being the corporate tax rate). It is generally conceded that even a moderately liberal plan of accelerated depreciation might cost as much as \$1 billion a year for several years.

However, should business conditions take a turn for the worse, Congress might well be prodded into action on the grounds that business might be willing to take a greater chance on investments if a substantial part of the investment could be gotten back in a short time by means of accelerated depreciation. Should any action by Congress eventually come about, one of the more likely proposals would be to shift the burden of proof from the taxpayer back to the Bureau of Internal Revenue, as was the case prior to 1934. This would mean that if a company's estimate of useful life of its physical assets differed from that of the bureau's much-maligned Bulle-

tin F, the bureau would have to prove its case. The proposal that business be allowed to fix its own depreciation allowances is not likely to gain support of any consequence, since neither Congress nor the bureau was satisfied with this situation when it prevailed prior to 1934.

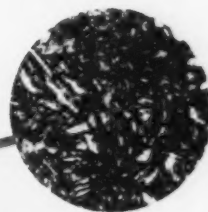
Depreciation Policies Pushed

Accelerated depreciation, which gained much favor as a result of wartime practices, is also being pushed, notably by the machine tool industry. Capitol wags say that this proposal, which would discard the bureau's "useful life" concept, might well gain considerable favor since it is backed by Henry J. Kaiser who seems to have a way of getting just what he wants in Washington.

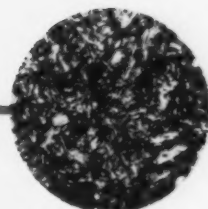
Another proposal which undoubtedly will be given serious consideration is to allow unused depreciation to be carried forward, for there is no benefit if depreciation is taken in a year in which business suffers a loss. The bureau might have a difficult time talking this one down since this policy is now applied to other sections of the tax laws. Still another proposal

specified

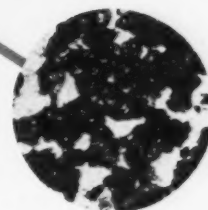
definite hardness pattern in C-1050
spur gear teeth; surface hardness Rc63;
distortion next to nothing



structure at corner of
tooth, Rc 63



structure at pitch line

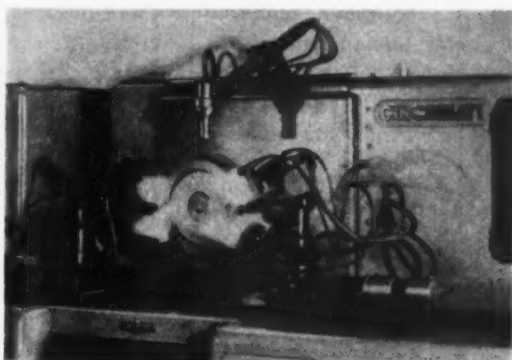


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calls for the allowing of replacement costs rather than historical costs as a basis for depreciation allowances with subsequent revaluation of all assets and depreciation based on these new values. This idea is not likely to get anywhere since it is condemned in all but a few segments of industry.

Small business, which is generally conceded to be under a severe handicap as a result of existing depreciation policies because it is dependent largely on internal financing and generally obtains less favorable terms on bank loans, will also get considerable attention. Small business is also largely ill-equipped, financially and personnel-wise, to battle with the bureau over differences of opinion as to periods of write-off.

Generally, the subject has become more pressing since the end of the war and, with present policies having been adopted at the bottom of the depression with a view to increasing revenues temporarily, increasing Congressional interest is not at all strange.

Munitions Board Plans A Central Security File

Working quietly behind the scenes of present mobilization planning, the Munitions Board is engaged in setting up a well-documented Central Security File. It will maintain data on firms, organizations, and individuals who have been cleared by the military departments.

This move, in charge of the board's office of manpower, has two primary motives. One is to cut down on the chances of enemy agents and other unauthorized persons getting possession of classified trade secrets and information concerning who might be manufacturing what for which departments.

The board and top military officials, including the White House, are now convinced that any attack on this nation would come from two directions or sources. One would be a direct attack with air power. The other would be an organized sabotage campaign. Officials expect that sabotage on key industrial

facilities which make—or are equipped to produce—critical military items. They expect the sabotage to begin simultaneously with, or a little in advance of, military attack.

Will Reduce Duplication

The second reason is to reduce duplication in clearing businesses and individuals with the military. As it stands, forms for security clearance have to be filled out not once but many times. Under the new Central system, only one form will have to be filled out for clearance for all military departments and technical services. Each agency will maintain a check list of names and firms so cleared.

The board is also readying a set of instructions and methods which may be employed by industry to reduce the danger of sabotage if an emergency arises. This is included in a handbook which will be ready for distribution to industry early next year.

This publication will serve as a basic manual which will be followed by others that will deal with hazards peculiar to specific industries from both sources—potential aerial bombardment from without and sabotage from within.

THE BULL OF THE WOODS

By J. R. Williams



Proposes Amendment to Revise Federal Patent Laws

Amendment of the federal patent laws to reduce the existing 17-year period of protection to 7 years is being considered by a Congressional committee.

This marked departure from the traditional protection afforded American investors was proposed to the House Judiciary Committee recently by David M. Kasson, General Die & Stamping Co., New York.

Any such proposal would have tough sledding on Capitol Hill, however, since it has been generally recognized that in a highly-industrialized nation, it often takes many years after an original patent is granted before the product can be tested, manufactured, and marketed on a large scale.

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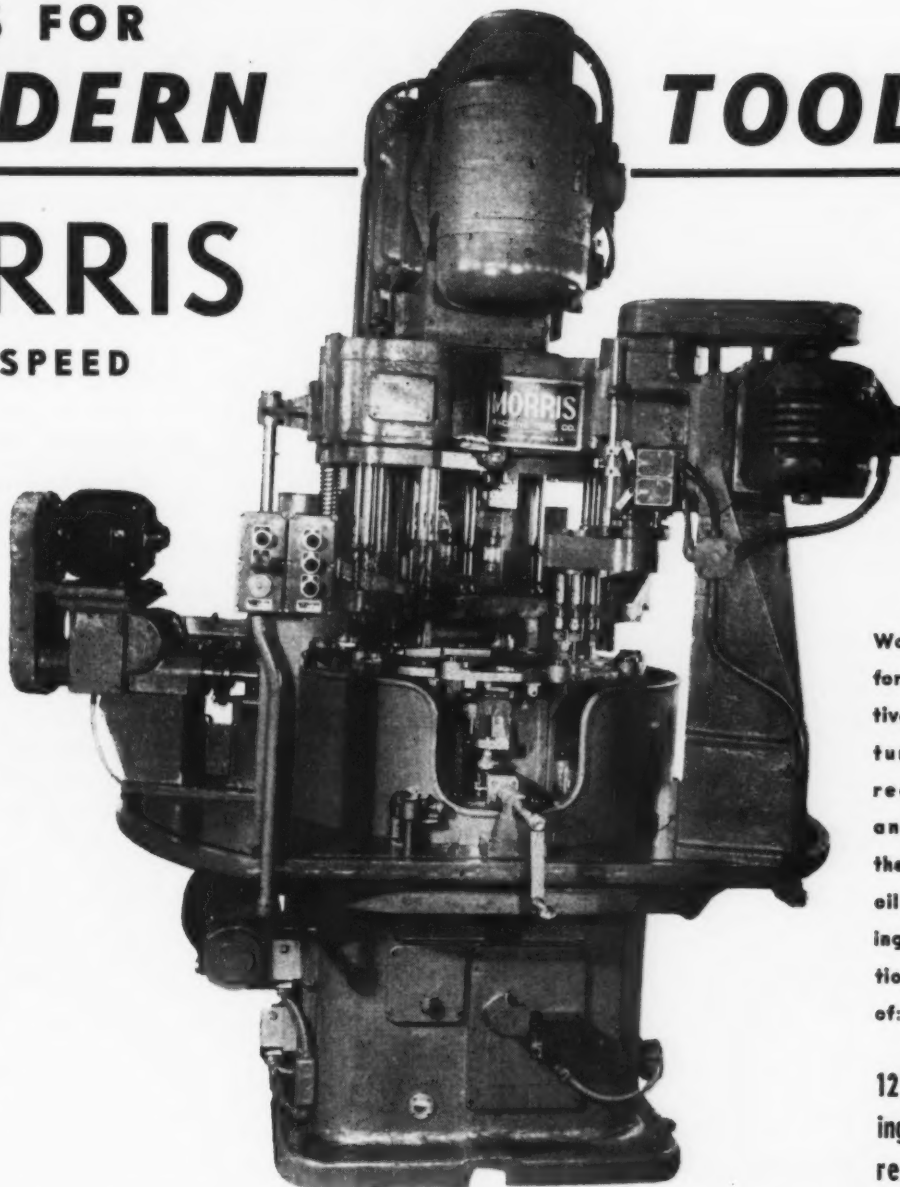
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ing. The opera-
tion consisted
of:

12 vertical drill-
ing, two vertical
reaming, four
vertical tapping,
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drilling opera-
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WEST COAST PROGRESS REPORT



Bethlehem settlement and renewed production welcomed by steel users . . . Independent producers continue at high rates.

San Francisco — Smoke pouring from the openhearth stack of Bethlehem Pacific's plant at Seattle, South San Francisco and Los Angeles early last week was viewed with mixed emotions by western steel fabricators.

Although this resumption of production portended a renewed supply of bars, shapes, wire products, nuts and bolts, and universal plates, the basis of the settlement which brought this about may be packed with dynamite for some of the smaller fabricators.

Small Fabricators Worried

This thought has been expressed by some steel users who believe that Big Steel will settle for something very close to Bethlehem's settlement and that once that happens labor will begin to extend its demands for pensions and security to some of the smaller fabricators. Here in the West where most metalworking plants are relatively small, the added cost of such a program would prove extremely burdensome from an administrative standpoint as well as an economic standpoint.

Bethlehem Pacific got all of its plants in production Tuesday, Nov. 1 with two openhearth in operation at South San Francisco, two at Seat-

Digest of Far West Industrial Activity



by

J. Reinhardt

tle, and one openhearth and one electric furnace at Los Angeles in heat. Two rolling mills were working at South San Francisco after the strike ended.

No Repair Work Necessary

Before the end of last week approximately 3800 men had returned to their jobs and production began without incidence and there was approximately no repair work necessary on the cold furnaces. As a result of this break in the deadlock work has been resumed on the wing of the California State Capitol, which had been delayed for 3 weeks and Bethlehem Pacific reports they expect to finish the contract before the scheduled Dec. 29 completion date.

Bethlehem Pacific's three West Coast plants have approximately 15 pct of the western ingot capacity and it is anticipated that near capacity and normal operations will be reached within 3 weeks.

Independents Not Affected

Independent steel producers who continue to operate throughout the strike are at high operating levels and anticipate no interruptions because of labor management differences. Kaiser Steel Corp. had negotiated a contract with the CIO on the basis of 6¢ for pensions and 4¢ for social security, both to be paid exclusively by the company and it is believed that no further adjustments will be requested by labor.

Judson Steel Corp. at Emeryville, Calif. also agreed to the 6¢ and 4¢ contract which is not likely to be opened for any further negotiations, at least until after Big Steel signs.

Thus far western industry has come through the strike without serious economic loss, aside from that directly connected with the producers. Warehouses still maintain sufficient stocks in most items to carry through for several weeks, although sheets of course continue to be extremely scarce.

Production Schedules Not Cut

In the Los Angeles area General Motors was the first to switch to a 4-day week with Ford scheduling a close-down of his Ford and Lincoln-Mercury assembly line between Nov. 11 and 15.

Other auto assembly units are watching stocks closely. Nash-Kelvinator Corp. has written a letter to its employees warning them that they could not continue operations beyond Dec. 2 unless the mills could replace dwindling eastern stocks of parts. Quick replacement would al-

They're both LOK-THRED

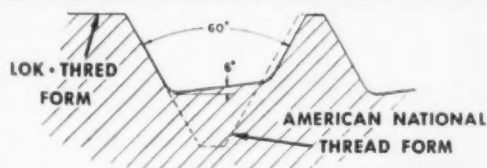
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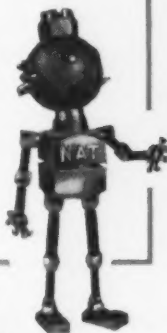
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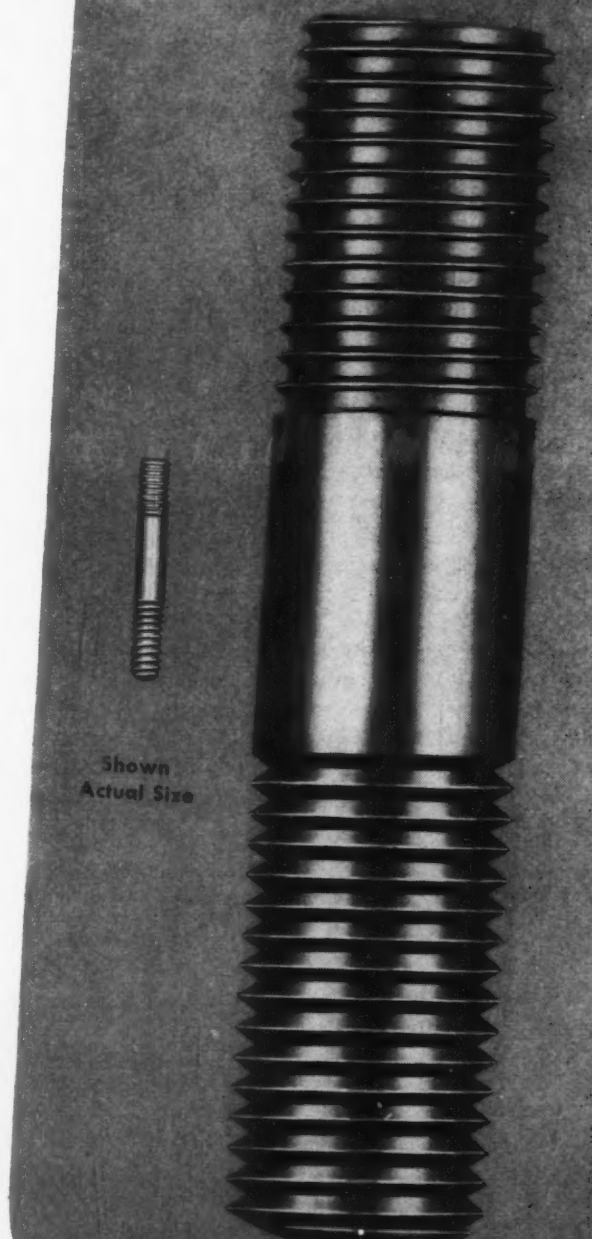


Note Lok-Thred's larger cross section . . . and flat root surface instead of a relatively sharp "V" . . . as compared to the American National Thread form. Here's the secret of Lok-Thred's greater strength.



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low the company to continue without a layoff.

In Utah, construction of Kennecott Copper Corp.'s \$16 million electrolytic refinery at Garfield is proceeding on schedule although it had been thought that a steel shortage might cause a slow down there. Louis Buchman, in charge of western operations reports that the overall project is more than 60 pct completed. The refinery is scheduled to get into production in the early fall of 1950 and will employ approximately 800 men and have an initial capacity of 12,000 tons per month.

Kaiser Reveals Purchases, Payments and RFC Loans

Oakland, Calif.—Kaiser Steel Corp. has paid the Federal Government \$53,742,000 on its RFC financed plant at Fontana, Calif., according to a public accounting presented last week by Henry J. Kaiser.

In this statement presented according to Mr. Kaiser, because, "So much incomplete information has been given the public regarding Kaiser purchases and payments on former war plants," it was reported that loans totaling \$123,305,000 were authorized by RFC on the steel plant and that the largest amount

outstanding at any one time was \$109,180,000. Already \$35,083,000 has been paid on principal and \$18,659,000 in interest on the Kaiser steel plant.

Kaiser enterprises, which comprise approximately 28 separate industries and in total represent the largest single debtor to the government, have already returned to the tax payers' kitty \$112,231,000 plus \$75,855,000 in taxes or a total of \$188,086,000. This is broken down as follows:

Principal	\$71,015,000
Interest	23,569,000
Rentals	17,647,000
Taxes	75,855,000

Assets Secure All Loans

In addition to the security of the government's interest in all of its wartime investments and plants, the report states that the assets that secure any Kaiser loans and purchase payments have been increased by \$112,829,000 of private funds. This is detailed: Kaiser steel invested in Fontana plant out of post-war earnings, \$41,237,000; Permanente Metals Corp., invested in Kaiser aluminum improvements and expansions, \$11 million; Kaiser-Frazer Corp., investments in plants, machinery, facilities, etc., \$60,592,000.

In further explaining the position of the Kaiser enterprises as a good

credit risk, the report goes on to say that although the RFC had authorized a loan to Permanente Cement Co. of \$3,500,000, this was not used and the project was financed privately; the loan of \$28,475,000 to the Permanente Metals Corp. plant which produced magnesium during the war was repaid in full plus \$3,600,000 interest; a loan of \$1 million to Kaiser Fleetwings, Inc. was repaid in full plus \$77,000 interest.

Operation of former war plants by the Kaiser interests since the end of the war has resulted in: Peacetime employment of 55,058 persons; total payrolls of \$446,544,000; return of funds to the government of \$188,086,000; and the production of goods and services valued at \$869,722,000; according to this public report.

Engineers Analyze Air Flow In New Caltech Wind Tunnel

Los Angeles—Now being analyzed by aircraft engineers was the disclosure by California Institute of Technology and the Army Ordnance Dept. that the school has produced a speed of more than 10 times the velocity of sound in its hypersonic wind tunnel.

The previous highest known speed of air flow in supersonic wind tunnels was about seven times the speed of sound which is approximately 760 mph at sea level.

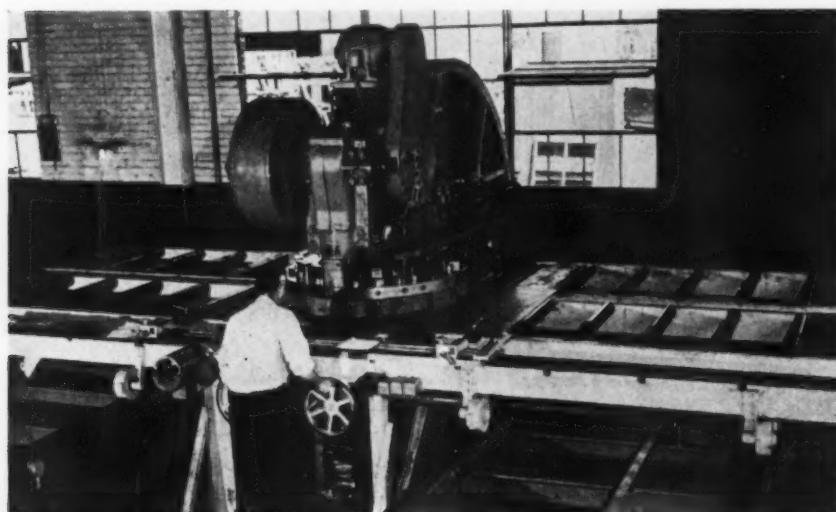
The project culminating in this development was initiated by ballistic experts of the Ordnance Dept. in anticipation of the need for wind tunnels having tremendous air speeds in which intercontinental missiles or projectiles of the future may be studied.

Can Handle All Tests

Thus, in the new tunnel at Caltech, man has for the first time an apparatus that will allow him tunnel tests at speeds well above those of the most advanced rockets and missiles.

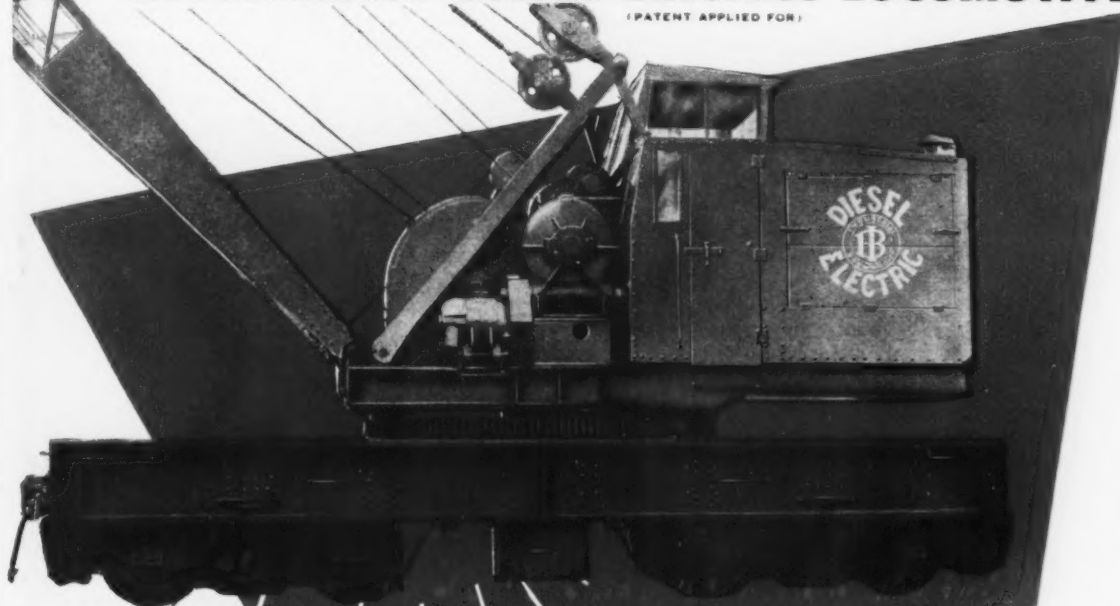
A guided missile designed with the aid of the new Caltech tunnel could take off from Los Angeles and arrive at Sydney, Australia—a distance of almost 7600 miles—in about an hour.

TIME SAVER: This Weidemann automatic punch press, recently installed at General Electric's Oakland, Calif., works, punches any of 24 different dies or a combination of dies in sheet steel, which is used in the manufacture of transformer tanks at the plant. The machine is capable of positioning the holes to within a tolerance of plus or minus 1/32 of an in.



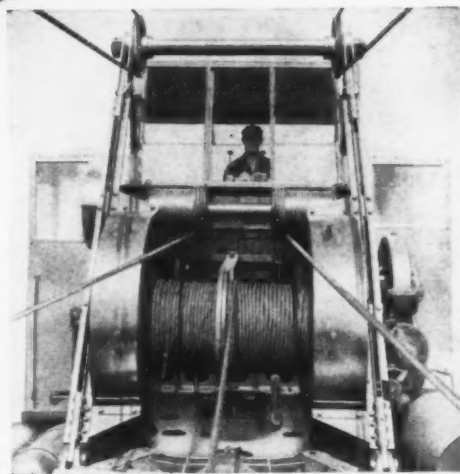
electric travel reduces maintenance costs of new **BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE-CRANE**

(PATENT APPLIED FOR)



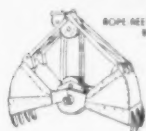
In designing the new Brownhoist Diesel Electric Locomotive-Crane for double duty as a powerful crane and switch engine, Brownhoist engineers had two prime objectives: to increase operating efficiency and reduce maintenance costs. The new Brownhoist Diesel Electric supplies *travel power directly to the axle from two oversize spring-mounted motors hung inside the AAR cast steel side frame trucks*. Power for hoist, swing, and booming is transmitted through a helical gear reducer. Simple, efficient, trouble-free!

These are only two of the many money-saving, labor-saving, time-saving features engineered into the Brownhoist Diesel Electric Locomotive-Crane. Others include the patented Monitor-type cab that affords the operator 360° visibility—travel speeds up to 15 M.P.H.—double disc roller bearing mounted rotating clutches—roller bearing boom tip sheaves—14" safety clearance between car body and rotating bed—safe worm driven boom hoist. Capacities 30 tons and up. Write for complete facts that will show you how to speed and simplify your material handling at lower costs.

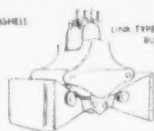


This view shows how the electric travel reduces the crane crab mechanism to a minimum with only **three** widely spaced horizontal shafts accessible from all sides. Note the 360° vision Monitor-type cab with hoist and boom hoist drums in full view of operator.

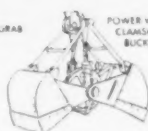
BROWNHOIST BUILDS BETTER CRANES



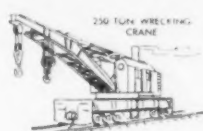
ROPE REEVE CLAMSHELL BUCKET



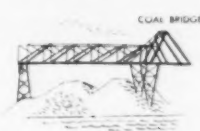
LINK-TYPE ORE GRAB BUCKET



POWER WHEEL CLAMSHELL BUCKET



250 TON WRECKING CRANE



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COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by BRIDGEPORT BRASS COMPANY

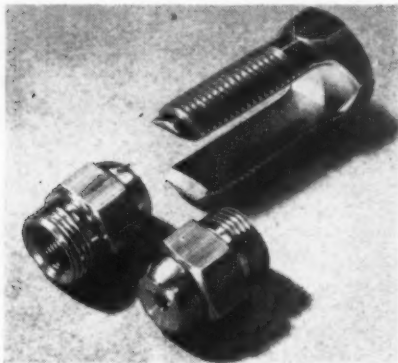


Headquarters for BRASS, BRONZE and COPPER

Machining Duronze III Silicon Aluminum Bronze

High strength and corrosion resistance of Duronze III has led to an increasingly greater use of this silicon aluminum bronze by designers for functional parts.

With a tensile strength of more than 40% greater than mild steels, Duronze III exceeds in corrosion resistance most of the other copper-base alloys. Although produced in casting form, the greatest demand is for rods for forging and screw machine parts. Despite this metal's high copper content, it is harder and tougher than the other copper-base alloys and requires special care in machining. It has a machinability rating of 60 based on free-cutting brass equaling 100.



Oil burner jets and various types of electrical clamps and fittings are among screw machine products made from Duronze III.

Screw machine fabrication of silicon aluminum bronze (Duronze III) can be improved through fully understanding the physical characteristics of the material and selecting machines, tools and procedures capable of doing the job.

Duronze III, with 91% copper, 7% aluminum and 2% silicon, has a tensile strength in the annealed state of 90,000 psi with a hardness of B85 (Rockwell). Although the chip is brittle and breaks off similar to the leaded screw machine brass, the toughness of silicon aluminum bronze necessitates the use of a machine roughly 25-30% larger than what would be selected for leaded brass rods.

Coolant Control Necessary

Friction between the tool and bronze is considerable and this heat must be

carried off as quickly as possible. A sulphur-base mineral oil with a comparatively low viscosity of around 100 Saybolt Secs. acts satisfactorily. The coolant-lubricant must be well directed and in plentiful supply. Care should be taken that pressure is not so great as to merely splash off tools and work.

The highest possible hardness is recommended for the tools. For example, a form cutter with a C62 Rockwell gave four hours less life than the same tool of C65 hardness under identical conditions. For long-run production the use of cast metal, carbide-tipped or electrolyzed high speed tools are strongly recommended for increased tool life and high speeds.

Tool Setting Important

Tools must be set on center, or slightly below, to insure correct front clearance as silicon aluminum bronze will wear the tools at a rapid rate if there is any rubbing.

Rigidity of tools and tight spindles will also reduce chatter and permit higher speeds.

Rake angles on forming and box tools should be held to a minimum, ranging from minus 5 degrees to plus 5. For a starting point, zero rake is advisable. This angle can then be varied either side of center to fit the demands of the job.

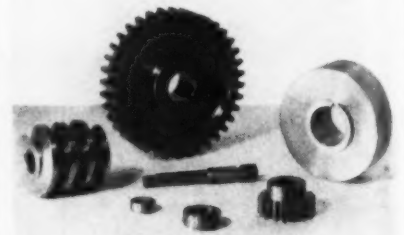
Use Minimum Tap Rake

The hook on taps should also be kept to a minimum. One manufacturer has successfully operated with a minus 7° rake angle. Positive rake in any event should not exceed 2 to 4 degrees.

Flattening the cutting lip of drills is used by many fabricators although the standard spiral drill can be used satisfactorily. Reamers should be slightly oversize as this metal has a tendency to close in.

Speed and feed is dependent on the depth of cut or the size of taps and drills, and in the case of forming tools, the width of the cut.

A speed of 150 to 250 surface feet per minute on high-



Here are several examples of where Duronze's high-strength and wear and corrosion resistance serves to produce a better product.

speed steel forming, cutoff and box tools is normal, with a feed from 0.001-0.003 in. However, in the case of carbide and other extra hard cutting tools speeds ranging from 250-500 sfpm can be attained.

Good Finishes Obtained

Studies show that finishes remain good despite wide ranges of cutting speeds. The main difficulty at high speeds is maintaining cutting edges.

Sharp tools are essential in machining silicon aluminum bronze. An interesting factor is that tools do not gradually become dull on this material but fail within a few minutes after the first indication of wear.

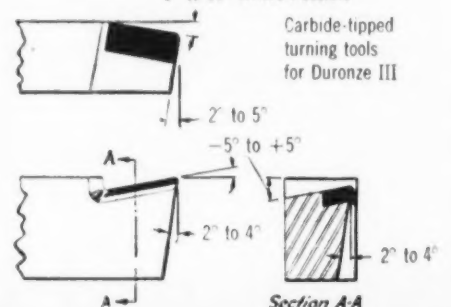
It is essential that the dwell cycle be cut to the absolute minimum due to friction. Tool life is greatly increased when tools are withdrawn as soon as they stop cutting.

Serrated collets are recommended where drilling and end operations are carried out.

Bridgeport's Laboratory stands ready to help in the selection of the proper alloy and to help fabricators with the working of copper-base metals. Call the nearest district office or write Bridgeport Brass Company.

TOOLS FOR DURONZE III

5° to 10° Where Possible



Rake angles for single-point turning tools hold for forming tools. Minimum rake angles also hold true for high speed steel.



IRON AGE
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FEATURE ARTICLES

An Evaluation of Radioactive Isotopes in Metallurgy

By C. E. BIRCHENALL

and

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SUMMARY: A realistic appraisal of the advantages and limitations of radioactive tracers in metallurgical research and development. Characteristics of various radioisotopes are described and experiences obtained in investigating potential applications are explored. Information is also presented relating to personnel problems, involving handling and exposure problems.

RADIOACTIVE isotopes have established their worth in metallurgical research and development, but, as in the exploitation of every other new tool, it has taken time to learn how to use them and where they can be most helpful. The Metals Research Laboratory has now had about 2½ years of experience in varied uses of radioisotopes in connection with a research project sponsored by the Office of Naval Research, the general scope of which was previously described.¹

It is the purpose of this article to evaluate the usefulness to the metallurgist of the by-products of the atomic pile, as well as to describe

some of their limitations and the problems associated with handling them.

A brief review of the program will show the diversity of applications of radioisotopes which have been dealt with, but it is not intended to cover all the activities. While work has been entirely laboratory experimentation, it covers both process and physical metallurgy, and much of it is quite similar in nature to industrial development activities.

In the process field, radioactive iron and calcium have been used to study reactions between molten iron and slags, while the physical metallurgy section has used five different isotopes in

studies on diffusion in metals, oxidation and scaling, and in attempting to study structure or segregation by exposure of photographic film to radioactive alloys. Tracers are also being used as an analytical aid in determining vapor pressures of metals.

It should be emphasized that radioactive tracers are used as a tool to further the approach toward the fundamental objectives of an overall program rather than as a subject for study in themselves. Nevertheless, it has been necessary to delve into their properties and to develop procedures for handling them. This involves a balance between rigorous technique and the fraction of effort which can be expended for this phase. Such a decision would probably face any metallurgical laboratory preparing to do tracer work. Considerations affecting the choices and experiences resulting therefrom, as encountered at the Metals Research Laboratory, should be of value in such cases.

One of the interesting features of radioisotopes is that one cannot predict when a given atom will disintegrate, but can only say that each unstable atom has a characteristic probability of decomposing in a chosen time period. Of any given collection of such atoms, the number that will decompose is directly proportional to the number present; if half of them disintegrate in a certain time period, then half of those still remaining will decompose in the next like time period, and so on. The half-life for radioactive decay is, then, one of the ways to identify a specific radioisotope. The other method of identification is by the kind and energy of the radiation emitted when the isotope decomposes.

The useful radiations given off in decay reactions are the beta and gamma rays. These have quite different properties. The former is an electron of either negative or positive charge which loses energy fairly rapidly by ionizing matter through which it passes. Betas of 0.5 mev energy will be effectively stopped by 0.107 g per sq cm of aluminum.* On the other hand, gamma particles are high energy X-rays having no charge or mass. They penetrate matter readily, causing little ionization. An average gamma activity of the same energy as the above beta will require 9.0 g per sq cm of aluminum to reduce the beam

* The absorption of beta rays depends predominantly on the quantity of mass in the path of the particle beam; the material of which the absorber is made is comparatively unimportant. It is therefore convenient and common practice to specify the "thickness" of beta absorbers in terms of mass per unit area perpendicular to the path of the rays. Linear thickness times density = cm \times gm/cu cm = gm/sq cm. The absorbing material for beta rays is usually stated for the sake of accuracy. On the other hand, gamma ray absorption depends strongly upon the substance, and the absorber must be named.

intensity only to half its initial value. There is little or no occasion to deal with alpha particles in ordinary metallurgical work.

Because of the essentially different character of beta and gamma rays, the most effective methods for counting them are different. In the work described, it was desirable to select the single method that seemed likely to give the best average results for the variety of problems expected to be studied. This would prevent expending an undue amount of effort on the development of counting procedures, a serious limitation in small groups.

Since most of the isotopes intended for use had beta activities, the decision was made to employ thin mica end-window beta counters, which are standard commercial products.

The essential components of these counters are a cylindrical metal cathode and a wire anode mounted at the axis of the cylinder and electrically insulated from it. These are sealed in a tube closed at one end by an exceedingly thin (less than 0.0005 in.) mica window and filled with an appropriate gas mixture. The anode is charged to a potential of about 1200 v. When a beta particle enters through the window, it ionizes some of the gas molecules. Acceleration of the ions by the potential field causes a momentary avalanche discharge within the tube. This electrical pulse is electronically amplified and recorded on a mechanical counter through a scaling circuit.

While the choice of this type of counter is the probable cause of some later problems, it did serve to eliminate other difficulties that might have arisen had a different choice been made. The primary consideration involved was the efficiency for counting beta particles, which is very high, since nearly every beta entering the tube discharges the counter. However, many gammas may pass through a tube without forming ions, so the efficiency for gamma counting is low.

Types of Tracer Applications

Applications of radioactive tracers may be divided into three groups: (1) Essential applications in which the information sought can be gained by no other method (except, perhaps, by the use of stable isotopes and the mass spectrometer, a method which will seldom if ever be attractive if a suitable radioisotope is available); (2) expedient applications in which the use of tracers simplifies or speeds a procedure or increases its sensitivity or accuracy compared with a conventional method for obtaining the same kind of information; and (3) improvident applications where, either because of poor judgment in planning the experiment or for the sake of showmanship, radioisotopes are used for a job which could be done as well or better by ordinary methods.

Essential applications include reactions in which atoms of a given element are trading places with other atoms of the same kind, either

FIG. 1 — Melting hoods used in radioactive work at Carnegie Institute of Technology. Melting operator is shown measuring an air respirator, rubber gloves, head dress, a film badge on his vest and a pocket electroscope. The other operator, working under a hood but not on melting operations, wears only rubber gloves and a film badge on his wrist.



in the same phase or across phase boundaries (in equilibrium systems) or even through a complicated manufacturing process, and it is desired to follow the paths of individual atoms to learn how fast they travel, where they came from, or where they are going. An example of this is the measurement of self-diffusion coefficients. Self-diffusion is important in such practical operations as heat treating of steel, sintering of powder metallurgy compacts and probably in high temperature creep of metals. Up to the present time, self-diffusion coefficients have been measured in the authors' laboratory in alpha and gamma iron and in close-packed cubic cobalt.

Most measurements were done by the surface activity method, i.e., by observing the decrease in activity of the surface of a disk on which active material had been plated after the disk had been heated for a long period to diffuse the active atoms into the surface. The decrease in activity arises because the intervening metal now absorbs much of the energy of the radiations.

A closely related essential application of tracers is the study of the exchange of iron atoms between molten iron and a slag containing iron oxide in equilibrium with the bath. This may help to explain oxidation in the openhearth, because iron oxides are generally believed to be the vehicles which carry oxygen from the furnace atmosphere through the slag to the metal bath. The study can be made either by adding radio-iron to the metal or an active iron oxide to the slag and then sampling periodically to learn how long it takes for the radioactivity in the other phase to reach a constant level. Enough work

of this kind to provide quantitative conclusions has not yet been done, but the exchange seems to take place very rapidly. Radioactive tracers are not used to study the rate of transfer of sulfur, manganese, or other elements between slag and metal under non-equilibrium conditions, or to establish equilibrium constants, because these studies can be done just as well by ordinary chemical analysis.

In the field of solid-solid reactions, tracers are used to study the mechanism of oxidation of metals. A thin layer of radioisotope of the metal is plated on the surface, which is then exposed to controlled oxidizing conditions. An analysis of the distribution of the radioisotope through the scale layer tells whether oxide formation was by diffusion of metal through the oxide to the atmosphere or of oxygen through the scale to the metal. Practical applications include corrosion, protective oxide films, passivation, etc.

An excellent example of an industrial application of tracers was the investigation made by A. D. Little, Inc.² to learn whether pyritic sulfur in coal behaves any differently than organic sulfur during the coking process. Tracer methods provided the only possible way of distinguishing between sulfur atoms from two different sources and following them through an involved process.

An entirely different sort of work in which a tracer was necessary, was recently completed in

¹ E. S. Kopecki, "Radioactive Tracers In Metallurgical Research," *THE IRON AGE*, Sept. 4, 1947, p. 60.

² "Radioactive Tracers in Steelmaking," *THE IRON AGE*, Apr. 29, 1948, p. 85.

the authors' laboratory. It was desired to learn whether a very small concentration of calcium might be present in molten pig iron because of reduction of CaO in the slag, just as substantial amounts of silicon are introduced by reduction of SiO₂ in the slag by carbon; it was hoped that the work could be carried farther than this to study the effects of temperature and slag composition and perhaps even to measure a calcium deoxidation constant. Ordinary methods of chemical analysis are too insensitive to detect minute concentrations of calcium that might exist in the iron, so some radioactive calcium was put in the slag as CaO, enough to give about 40,000 counts per minute from a small powdered sample of the slag. After the slag had been held molten over the iron for 1 hr and the heat had been frozen very rapidly, attempts were made in several ways to find radio-calcium atoms in the iron ingot.

It was not possible to find any calcium activity in the iron, but the calcium content must have been less than 0.00006 pct, because some radiation would have been detected if the calcium content had been greater than this. The tracer was needed because there was no chemical method sensitive enough for the purpose, and even the tracer method proved inadequate. The amount of radiocalcium in the slag could be increased to make the tracer method hundreds or thousands of times more sensitive, but it does not seem that the results would be useful enough to justify the expense of further experiments.

Radioisotopes are being used in place of chemical analysis in several expedient applications because they save a lot of time or work and thereby make it possible to produce results faster and cheaper. Vapor pressures over solid or liquid metals and alloys can be measured by allowing the vapor to stream through a pin-point orifice in a crucible lid and condensing part of the beam of vapor on a cold target; these data provide one of the best ways of calculating thermodynamic activities.

Pure silver is used to calibrate the apparatus. It would take several hours or days at some temperatures to collect enough silver on the target to be weighed accurately, but with the addition of a small amount of radioactive silver to the sample in the crucible, a quantitative estimate can be made by counting deposits made with only a few minutes' exposure. Thus a whole series of runs at various temperatures can be made in the time that would be required for only one determination if conventional methods were used.

For similar reasons, tracer methods are used to measure diffusion coefficients for one metal in dilute solution in others, such as cobalt diffusing into pure iron, nickel and copper. Not only is the counting technique equal to or better

than the precision of chemical analyses at very low concentrations, but the use of the absorption method of measuring decrease in surface activity makes it unnecessary to machine off with great precision and analyze innumerable thin layers from the specimens.

Other applications where tracers can provide information difficult to obtain in other ways have been suggested in the literature, including wear and lubrication studies, detection of leaks in closed systems, checking for stream pollution by supposedly impounded liquids, measuring rate of passage of materials through a process, flow meters, study of the mixing of converging streams of materials and many more. Other suggested uses of radioisotopes are those in which they serve as a cheap, convenient, or compact source of radiation to replace radium or X-rays, e.g., for radiography to reveal internal defects, in thickness gages for strip materials or coatings, for concealed-float liquid level gages, and in medical therapy.

Limitations and Precautions

As regards problems and limitations associated with the use of tracers, there are three major difficulties which may be encountered: (1) Extraneous and perhaps misleading counts from radioactive impurities; (2) uncertainty in interpretation of counting data either because the decay pattern of the isotope being measured is complex or because it has not been adequately studied and reported in the literature, and (3) inherent lack of resolution of photographic techniques for fine details of structure.

Many *irradiated units*, in which active materials are produced, contain radioisotopes of several different elements because of concurrent reactions in the atomic pile; the unwanted activities are sometimes much stronger than those of the element desired. This often happens in the preparation of certain irradiated units for which it is not possible to use a target material in its elemental form.

On the other hand, target materials which presumably undergo only one reaction to form a single radioisotope under neutron bombardment may contain traces of radioactive contamination either by accident or, more likely, because no material is absolutely pure, and the minor impurities in the starting material may be converted to radioactive species with high efficiency. If such radioactive contaminants are known or suspected to be present, they may be removed by chemical separations. The danger lies in the unsuspected presence of a small amount of radioactive contamination which may be completely masked in the original material by the radiation of the desired isotope, but which may follow a different path in accordance with its chemical identity in the process under investigation and give rise to evidence of radiation where there should be little or none.

A pertinent example of this problem is the

work done in this laboratory with radiocalcium. The first ingot which was made by melting under a slag containing active calcium gave a very definite count, much higher than anticipated; a second ingot melted under the same slag gave a much weaker count, while a third heat exhibited no positive activity. Counting data accumulated over several months showed that the half-life and energy of the radiation from the metal were not at all what they should have been for radiocalcium, but they corresponded quite closely with published data for radiophosphorus. The impurity showed the chemical behavior of phosphorus, both in the slag-metal reactions and in chemical precipitations. Because proper precautions had been taken both in attempting to duplicate experiments and in identifying the radiation being measured, the investigators were not misled into false conclusions; but a good many months were spent in the process of determining the impurity (a few parts per million of radiophosphorus in the radiocalcium unit). This sort of experience is typical of the hazards for which one must always be alert. Also, it emphasizes the necessity for identifying all activities being counted.

Some annoying and perplexing counting problems had to be solved in connection with the use of radioactive iron in oxidation and diffusion studies. The calculation of diffusion coefficients depends strongly on the absorption coefficient for the radiation in matter. For cobalt, this involves only a straightforward measurement of the activity of a cobalt source through absorbers

of different thicknesses. For iron radiation, this proved to be more complicated.

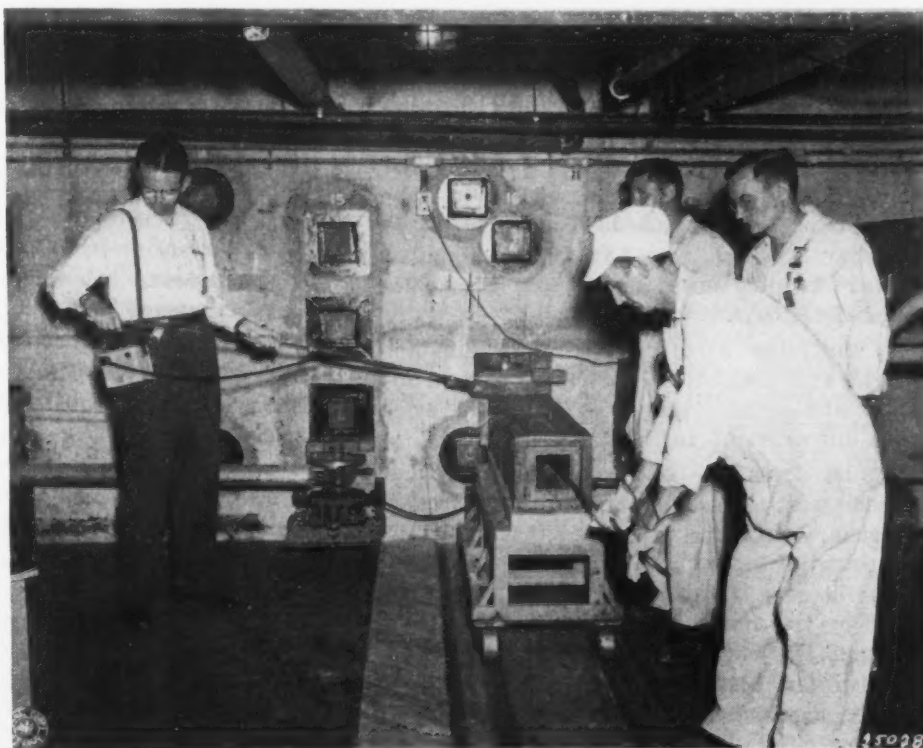
The unit contained two radioactive isotopes of iron Fe^{55} has two beta activities, 0.26 and 0.46 mev, and 1.1 and 1.3 mev gamma radiations. The half-life of this isotope is 44 days. Fe^{56} , with a half-life of 4 years, decays when its nucleus absorbs one of the orbital electrons, a process known as K capture. As a result, the new atom has an electron missing from its inner shell. Electronic transitions follow, emitting characteristic X-rays, in this case with an energy of 0.07 mev. It was not anticipated that the counting equipment would detect this to a noticeable degree.

When it was observed that the half-life of the unit increased as the unit aged, the presence of a radioactive impurity was suspected. Chemical separations were made on part of the unit in an attempt to identify the impurity. Although a positive result was obtained when some of the sample was partitioned between a molten iron and slag (the slag counted with a half-life of about 200 days, the iron phase about 60 days), this impurity could have been present only in trace amount and could not have produced the effect observed above. No other separation indicated foreign activities.

Radioautographic Techniques

It was finally concluded that the long-lived activity was Fe^{55} . This was confirmed by the similar behavior of another irradiation unit prepared from different samples of iron. It was also found that the absorption properties of both

Fig. 2—Pulling an isotope stringer from the pile at Oak Ridge. Job is monitored by health physicist.



units varied with time in the same manner. On this basis, it was possible to go back and correct all previous results since complete counting records were kept.

One use often proposed for tracers is radioautomicrography, using radiation from the active atoms to sensitize a photographic plate. It is then proposed that the images be magnified to show the detailed distribution of tracer materials in the system. Such an experiment was attempted on this project using a small iron cylinder carburized with active carbon and heat treated to form coarse pearlite. However, the greatest magnifications that could be obtained were between 20 and 50 diameters, not nearly enough to resolve pearlite. Even the low energy radiations from elements such as carbon and sulfur have ranges of the order of 100 microns in photographic emulsions, so little resolution can be expected unless ways can be found to focus or filter the radiation to confine the pattern from a point source to a very small area of film.

Limitations on Tracers

Current techniques, therefore, permit the use of the radioautographic method only for comparatively gross effects such as segregation in coarse dendritic structures. There is much useful work which can be done within these limitations, however, and improved techniques presumably will be developed.

Other limitations exist on the kind of experiments which may be done with tracers. Some elements which the metallurgist might want to study, magnesium for example, do not have radioisotopes of long enough half-life to permit time for experiments to be conducted. Other elements, such as nickel, require different types of counting tubes. Radioisotopes of a few metals cannot be produced in the atomic pile; manganese is one of these. Radiomanganese can be made by the cyclotron, but in very limited amounts and at much higher cost than pile-produced isotopes.

On the other hand, all tracer work is not fraught with difficulties: Radiosilver and radiocobalt studies have progressed without radioactive difficulties of any sort.

Turning from the technical to the personnel problems which arise from work with radioactive materials, it must be recognized that radiation is a potential hazard to personnel which is insidious because the damaging forces cannot be sensed by the victim until the injury has been done, and the long-term physiological effects of radiation are not yet fully understood. Fortunately, the vast majority of metallurgical applications of radioactivity involve tracers of

comparatively low energies which can be handled at exposure levels that are safe according to the best existing medical knowledge without excessively restricting protective measures.

The problem is not greatly different in kind from that of guarding against silicosis or other occupational diseases. The officer charged with health and safety bears the moral and legal responsibility of setting up and enforcing regulations which will adequately protect personnel from any real radiation damage. He also bears the responsibility of protecting his company against hysteria or against unwarranted claims of fictitious injury by establishing such written records of examinations and inspections as will prove that adequate precautions were taken for all persons who might conceivably have been exposed to radiation.

The first problem cannot well be avoided, because the Atomic Energy Commission will not authorize purchase of isotopes until reasonable assurance has been presented that they can be handled safely. The second responsibility is not likely to be overlooked by alert management. It may as well be recognized, however, that the problems are about in proportion to the number of people who may be exposed, theoretically, to radiation, and they become rather perplexing for applications on an industrial scale, especially if the segregation or disposal of scrap or product or the handling of dusts, fumes or gases may be involved.

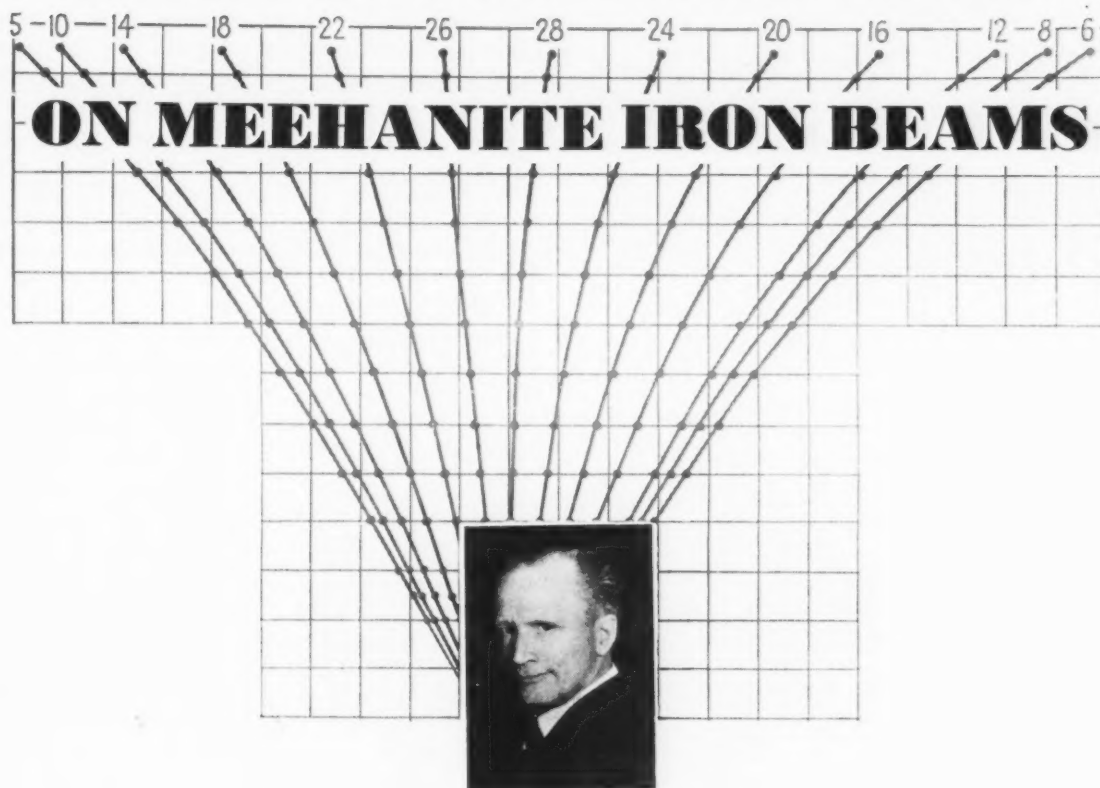
On the other hand, laboratory or pilot plant regulation is not excessively burdensome, especially if the work can be done in a restricted area. The fact that laboratory work can be handled safely is perhaps best attested by the fact that insurance companies that have studied the matter very carefully do not rate well-regulated radiation laboratories as any more hazardous than normal chemical or metallurgical laboratories.

Protective Measures

A resume of protective measures taken at the Metals Research Laboratory may be helpful to others interested in laboratory work. Over the 2-year period in which active materials have been in the laboratory, all personnel have had periodic blood counts, the period depending on their likelihood of exposure. Film badges and pocket ionization meters are worn when working with tracers. A commercial probe counting device, modified to greatly increase its sensitivity, is kept in the vicinity of active sources being worked with and is used to check surfaces, apparatus, hands, clothing, etc., when an operation is complete. In addition, a less sensitive survey meter has been added for estimating the activity of all major sources.

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SOME TRANSVERSE TESTS



By OLIVER SMALLEY

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ALTHOUGH considerable transverse test data is available on testing of cast iron beams, the nature of materials used and testing methods employed are such as to cause considerable misunderstanding and misinterpretation.

In an effort to clarify this unsatisfactory situation an investigation was conducted at the author's laboratory, utilizing latest production and inspection techniques. This study involved two types of Meehanite metal—types GM and GA—which conform to the physical characteristics indicated in table I.

Four test bars were cast upended in dry sand molds. Castings were left in the molds for 24 hr after pouring, and no stress relief heat treat-

ment was used. One bar from each material was machined to $1 \times 2\frac{1}{2} \times 36$ in., and one bar from each was machined to $2 \times 4 \times 52$ in. The samples were then surface ground on all sides to insure uniformity of dimensions, parallel edges and smooth surfaces for attachment of strain gages.

To avoid the combined effects of transverse shear and bending, the procedure of testing with concentrated center load was discarded in favor of applying two equal loads at equal distances from the supports, as shown schematically in fig. 1. That portion of the beam between the loads is subjected to essentially pure bending and no shear, and conditions are uniform on every cross-section in this part. The beams were tested

SUMMARY: A series of tests to determine the behavior of Meehanite iron beams are described. These investigations, utilizing a strain gage technique, show in part that the material appears to obey Hooke's law in bending up to about 30 pct of the ultimate load, and, at moderate loads, the modulus of elasticity is the same in tension and compression.

on span lengths of 33 in. and 48 in., with loads applied as indicated in the figure.

Previous investigators have tried to correlate stress and strain by measuring deflections and using the beam theory, but this is unsatisfactory since the material does not conform to the limitations of the theory except in limited values for loading. This method of measuring loads and corresponding deflections was discarded in favor of observing loads and corresponding strains

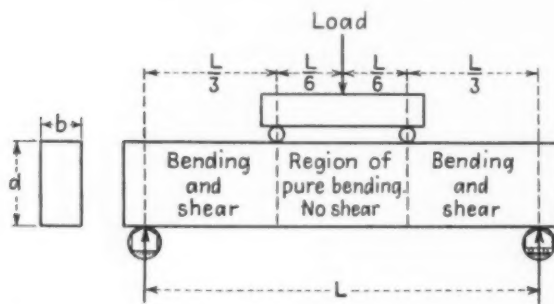


FIG. 1—Schematic loading diagram showing application of two loads to produce area of pure bending without shear.

measured with wire resistance strain gages. Twenty-eight gages were used on the small beams and 26 on the large. In each case three gages were placed on the tension side and three on the compression side; the remainder were spaced on the other two sides. An additional gage was placed on the tension side in the transverse direction on one large beam to obtain Poisson's ratio.

Wire resistance SR-4 type strain gages were chosen in preference to other forms of extensometers. Instead of the usual type with approx $\frac{3}{4}$ in. gage length and width of about $\frac{1}{4}$ to $\frac{3}{8}$ in., single strand wires were used. The advantage of the single wire is that strain is measured at a definite location on the cross-section. Since the beams were to be tested in pure bending, the 5-in. length of the straight wire presented no difficulty regarding space limitations, because strain conditions were uniform along the beams for one-third of the span length. The straight wire has advantages over the loop form due to extremely small width and absence of lateral effect large enough to warrant a correction. With the standard type A-1 gage made in a grid or loop form, the output will represent the mean strain along the gage axis if there is linear variation across the gage. If the strain distribution across the gage is nonlinear, the opposite will be true. In addition, it may be necessary to make corrections for transverse sensitivity.

The appearance of a test specimen with gages mounted is shown in fig. 2. The gages have been covered with wax to render them moisture-proof.

All four specimens were treated in a similar manner. Strains were observed with a single SR-4 strain indicator and a switching panel. The panel was convenient, permitting one indicator to be applied to all strain gages. Factor for the gages in each case was 2.11 except for the A-1 gage mounted in a transverse direction on the second of the large beams. Correction for the difference in gage factor and the lateral effect on this gage was made.

Principal results obtained in the tests are shown in table II. Strains observed in the trans-

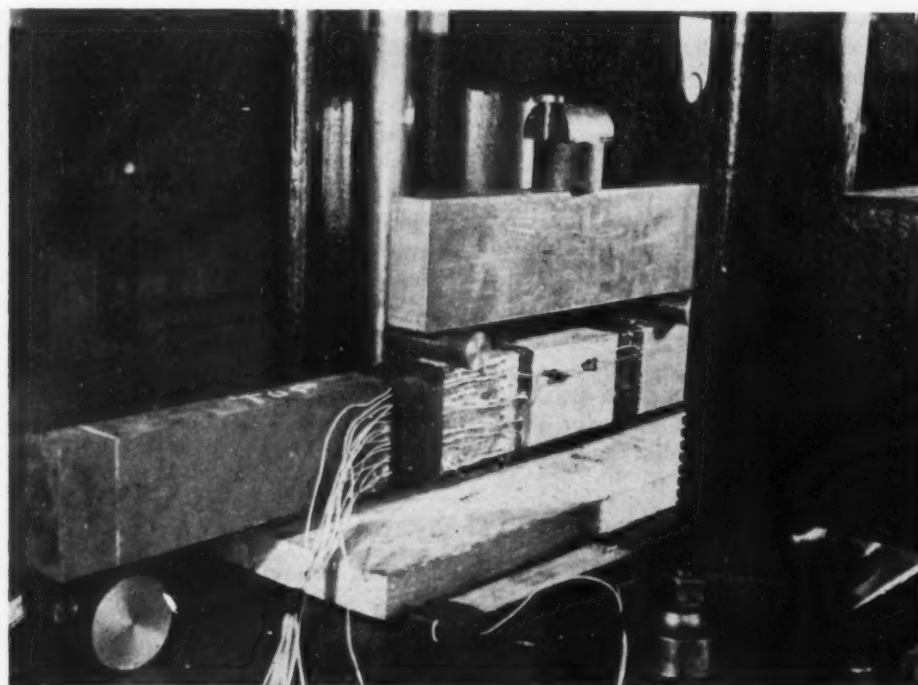


FIG. 2—Specimen mounted in testing machine with gages attached. The bar shown is a 2x4x52 in. sample.

TABLE I

Physical Properties of Materials Used.

Meehanite Iron	Proper Limit, Psi	Tensile Strength, Psi	Mod. Elasticity, Million Psi	Trans. Str., 1.2 in. Bar 18 in. Ctrs.	Defl., In.	Comp. Strength, Psi	Hardness, Bhn
Type GM	23,400	55,000	22	3550	0.29	200,000	235
Type GA	21,600	50,000	20	3400	0.31	175,000	227

verse tests have been plotted against load, and figs 3 and 4 illustrate load-strain characteristics at various positions across the beam section. Strains indicated by the three gages on the tension or compression sides have been averaged, as have those for pairs of gages on opposite sides of the beam. It is interesting to note, in fig. 3, the variation in strain at the center of the beam, and the shift of the neutral axis towards the compression side as the load increases. This is disclosed by the character of the strain (neutral to tension) at gages 27 and 28 which were on the neutral axis. The strains recorded also show that this effect is not apparent until a very appreciable load has been applied, and the displacement of the neutralism is not considerable at any time.

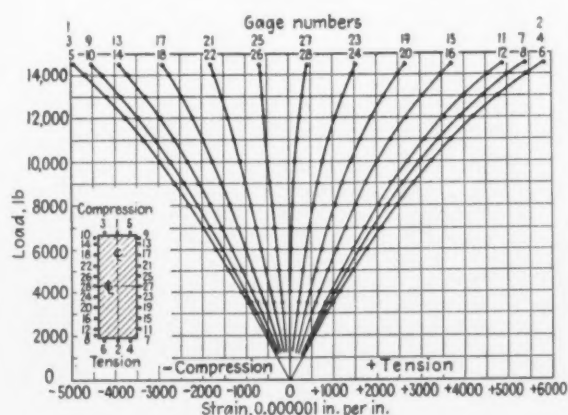
A detail of the strains on extreme fibers was plotted for each beam. A typical example is shown in fig. 5. From the plots of expanded strain scales, the modulus of elasticity corre-

sponding to the slope of the initial tangent to the load-strain curves, and yield strength, corresponding to an offset from the tangent of 0.0001 in. per in. strain, have been determined. In view of the difficulty of determining the deviation from linearity precisely, this figure for incipient yield strength may be taken as the equivalent of the elastic limit.

From the information shown in figs. 3 to 5, strains across the section have been plotted for the specimens at 20, 40, 60 and 80 pct of full load, as shown in fig. 6.

Results of the hardness surveys do not indicate any particular trend in a given specimen, hence one can say that the test bars were essentially uniform in character throughout. There is, however, an indication that the smaller specimens were harder than the corresponding larger pieces.

If one adopts the criterion of an offset of



0.0001 in. per in. strain as representing the limit of elasticity, then it is safe to say that the beams conform to elastic conditions up to approximately 30 pct of their ultimate load. Therefore, any calculations made from the beam theory involving Hooke's law should be quite reliable up to this load level. It appears justifiable to use the normal beam theory within such limitation.

An interesting condition is shown in fig. 6. In each case the strain distribution is linear, as would be expected with the manner of loading and conditions in the region of pure bending. In spite of the linearity of the strain condition, the neutral axis shifts toward the compression side. The shift, however, is only a very small percentage of the total depth of the beam.

Although the strain conditions are linear across the section the stress conditions are not. An approximation to the stress distribution can be obtained by reference to the corresponding stress-strain curves in tension and compression, reading the equivalent stress for a given strain. It must be recognized, however, that conditions prevailing in the beam are not the same as those prevailing in the test sample under direct axial stress, either in the tension or compression, nor with respect to the functioning of the gages.

The results of these tests should be considered as indicating trends, until they have been substantiated by similar experiments in other laboratories. Also, beams with cross-sectional forms other than rectangular should be investigated and similar procedure followed for comparison.

On the basis of these tests and in the absence of further confirmation it is possible to draw the following tentative conclusions: (1) At moderate load levels the modulus of elasticity is the same in tension and compression; (2) the material appears to obey Hooke's law in bending up to about 30 pct of the ultimate load; (3) the strain characteristics determined in the transverse tests indicate the validity of the beam theory to levels of about 30 pct of the ultimate;

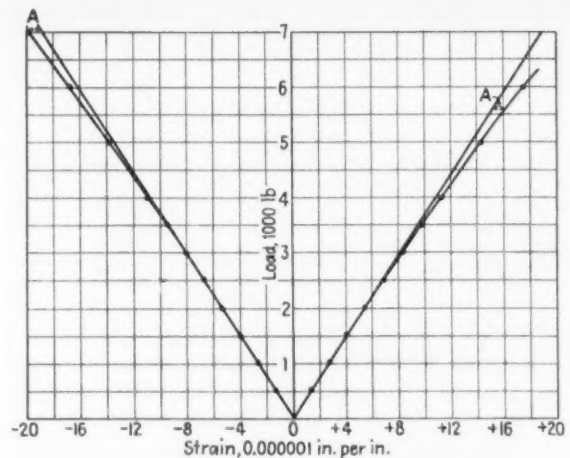


FIG. 5—Low range detail of load-strain on specimen M-6S showing the deviation from linearity (A). The average of gages 1, 3 and 5 are shown on the compression side, and the averages of gages 2, 4 and 6 are shown on the tension side.

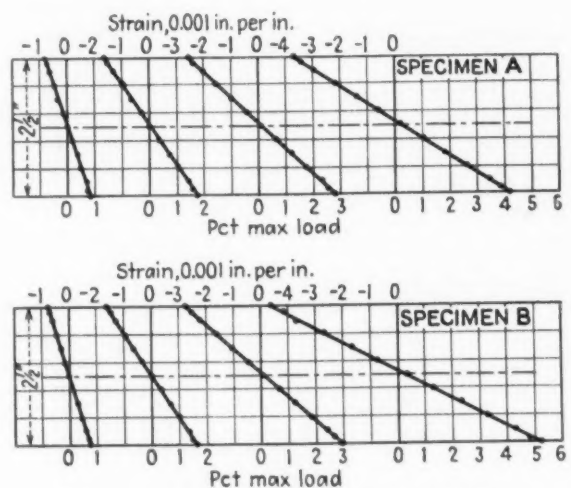


FIG. 6—Strains across transverse section. Specimen A is a $1 \times 2 \frac{1}{2} \times 36$ in. beam of Meehanite type GM; specimen B is a type GA beam of the same size.

(4) the strain distribution across a section in pure bending is not expected to be linear for values in excess of about 30 pct of the ultimate load; (5) the neutral axis shifts to the compression side of the beam by about 5 pct of the beam depth at a maximum.

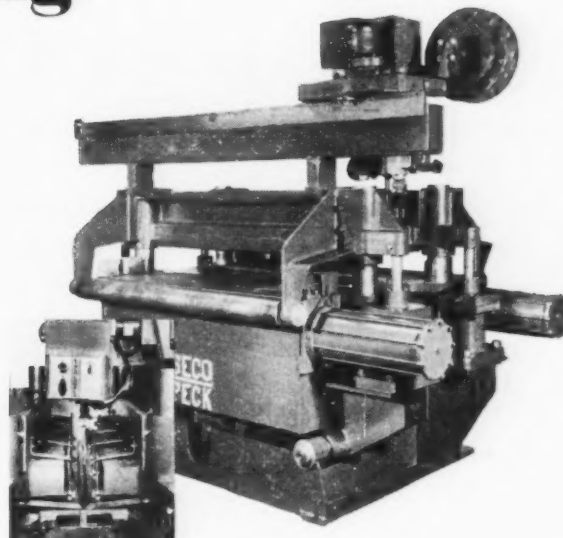
New Books

"Weld Design," by H. D. Churchill and J. B. Austin. Written primarily for the machine-base designer, this volume treats the subject of design from both the practical and theoretical standpoints. Principal emphasis is on presenting a clear picture of the many methods of processing plates and structural shapes to produce economical welded machine-base construction. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. \$6.65. 216 p.

"Depreciation," by E. L. Grant and P. T. Norton. The various types of business decisions related to the decline in value of physical assets are discussed. Intended mainly as a manual for accountants, engineers, industrial managers, and public officials, stress is laid on the accounting treatment of depreciation, particularly for purposes of Federal income taxation. Ronald Press Co., 15 E. 26th St., New York 10. \$5.00. 472 p.

Submerged Arc Welding Coil Ends

Coil ends are welded together by submerged melt arc welding in this machine. The inset shows the clamps in strip holding position with the welding head above the line of weld.



A SEMI-AUTOMATIC strip splicer, designed for welding together the sheared ends of strip coils to form a continuous strand through processing lines and for subsequent cold reduction, employs submerged melt arc welding. The splicer will handle strip steel ranging in thickness from 0.060 in. to 0.183 in., and in widths up to 56 in. The machine, shown in the accompanying illustration, consists of four essential units, the coil and positioner, the coil welder, the welding equipment, and flux reconditioning unit. Steel Equipment Co., Cleveland, designed the machine.

Coil ends are positioned in a welded steel frame, with the travel line of the welding head representing the cross-wide centerline of the machine. The welding anvil is held so that it may be raised or lowered 1 in. in the frame. The frame is movable horizontally $\frac{1}{2}$ in. This permits the welding anvil to act as a stop gage for the coil ends and as an anvil for backing up the weld. The entry platen of the machine moves horizontally 1 in. and the exit end is stationary.

The end of the outrunning coil is placed squarely against the stop gage, which protrudes 1 in. above the stationary platen. A clamping bar with 18 spring set plungers presses the strip edge firmly and evenly against the copper bar on the platen.

When the front edge of the oncoming coil is brought squarely against the stop gage, the clamping bar lowers and the welding anvil retracts and moves forward $\frac{1}{2}$ in. Then the com-

plete entry platen moves forward 1 in., bringing the ends of the incoming and outrunning coils together exactly over the centerline of the welding anvil. The inset in accompanying illustration shows the machine in closed position for holding the strip ends.

The welding head is permanently positioned over the welding line. To make the weld, a push button control permits the filler wire to make contact and the flux valves to open. The weld starts simultaneously with the carriage travel. Adjustably located limit switches start and stop the weld according to strip width. The welding head automatically returns to starting position.

Welding current, voltage and speed of the head are controlled with standard Lincoln Electric Co. automatic welding controls.

Upon the completion of the weld, the clamping bars raise 6 in., releasing the strip that is then free to travel at line speed. After the weld is completed, the granulated surplus flux is picked up by a flux reconditioning unit through a flexible suction hose. The glazed and hardened flux formed during the welding loosens and cracks as soon as the weld cools off. It is then removed from the strip by air blast when the weld is scrafed.

Strip guide rolls on the entry and exit ends of the machine hold the strip 1 in. above the platen during normal operating conditions. Moving parts are controlled by hydraulic cylinders and the hydraulic power is supplied by Vickers equipment. Strip side guides on the entry and exit ends are air-cylinder operated.

Growth of Cast Iron

SUMMARY: The author reports on an investigation of the growth characteristics of a series of high strength cast irons used for parts which may be subjected to elevated temperatures. Effects of various alloying additions on growth are discussed.

GROWTH, as applied to gray irons, refers to the permanent increase in volume which sometimes occurs when the metal is subjected to repeated cycles of heating and cooling, or stresses from within the metal itself. There has been much investigation of growth of cast irons, but most of this work has not been directly applicable to the problems encountered in the design and production of the products of the author's company.

It was determined, therefore, to conduct an investigation of the growth characteristics of a type of high strength cast iron commonly used by Allis-Chalmers for components of its products which may be subject to elevated temperatures. The investigation was to include a study of the effects on growth of various alloy additions in concentrations which would cover the ranges normally produced in the A-C foundry. Since test bars would be available, it was decided to take the opportunity to collect data on the various physical characteristics, besides growth, of the alloys to be tested. Table I gives the analyses of the base irons and the alloys used.

For each of these thirteen types of iron, two arbitration test bars, 1.2 in. diam by 21 in. long, were cast. The source of supply was a 2000-lb ladle half full of the base iron. From this a hand ladle of 26-lb capacity was used to pour the test bars. In each case, the weight of alloy to be added was placed in the bottom of the hand ladle and the base iron poured over it. The mixture was stirred vigorously before pouring the test bars.

These bars were tested in a Riehle transverse testing machine, with breaking load and deflection measured. One half of each broken bar was used for determination of Brinell hardness, tensile strength, chemical analysis and microstructure. The other half of each bar was precision machined to a bar 1 in. round by 9 in. long, and the ends faced off to exact right angles with the axis of the bar. These specimens were used for growth tests.

The growth tests were made in a controlled atmosphere furnace with a slightly reducing atmosphere, to hold formation of scale to an absolute minimum. Bars were held at different temperatures for 4 hr, then cooled to room tempera-

TABLE I
Chemical Analyses of Irons Tested

Test Number	TC, %	Si, %	S, %	P, %	Mn, %	Ni, %	Cr, %	Cu, %	Mo, %	Va, %	B, %
1	3.00	2.17	0.163	0.004	0.92	0.10	0.14	0.12	0.03	0.01	0.00
2	2.98	2.16	0.163	0.004	0.92	0.09	0.14	2.22	0.03	0.01	0.00
3	3.00	2.23	0.163	0.004	0.92	0.08	0.13	0.12	0.03	0.01	0.12
4	3.05	2.31	0.163	0.004	0.92	0.05	0.44	0.12	0.03	0.01	0.00
5	3.09	2.58	0.163	0.004	0.92	0.16	0.94	0.12	0.03	0.01	0.00
6	3.04	2.96	0.163	0.004	0.92	0.10	1.70	0.12	0.03	0.01	0.00
7	3.02	2.36	0.163	0.004	0.92	0.10	0.24	0.12	0.03	0.01	0.00
8	3.04	2.54	0.163	0.004	0.92	1.48	0.48	0.12	0.03	0.01	0.00
9	3.07	2.60	0.163	0.004	0.92	1.20	0.72	0.12	0.03	0.01	0.00
10	3.01	2.39	0.163	0.004	0.92	1.56	0.13	0.12	0.03	0.01	0.00
11	3.05	2.45	0.163	0.004	0.92	0.08	0.16	0.12	0.03	0.01	0.25
12	3.06	2.65	0.163	0.004	0.92	0.10	0.14	0.12	0.58	0.01	0.00
13	3.05	2.31	0.163	0.004	0.92	0.11	0.12	0.12	0.64	0.01	0.00

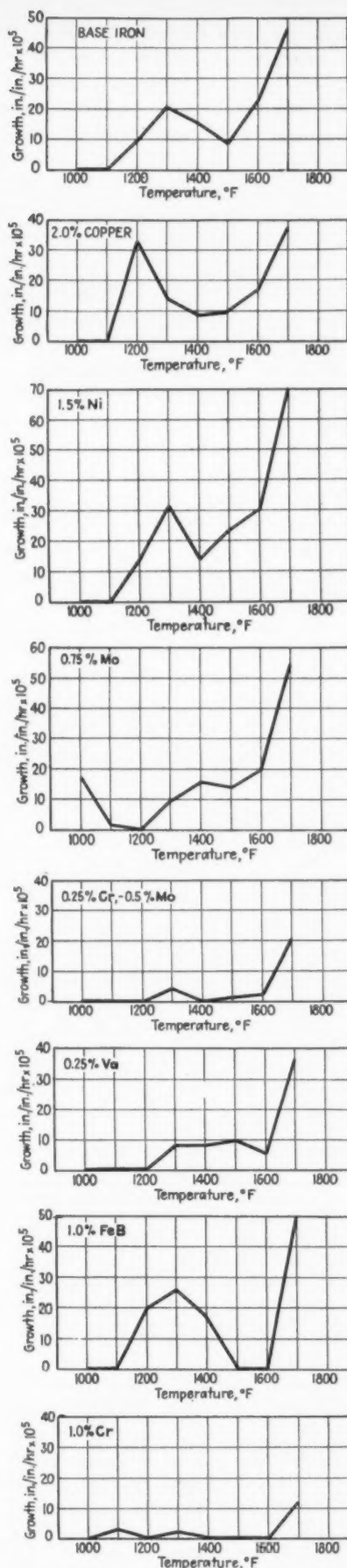


FIG. 1 — Curves showing growth characteristics of various types of high strength cast irons. These curves were developed from the data given in table II.



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ture and measured by being placed across V blocks and measured with a micrometer.

So far as was observed, there was no warpage, surface cracks, nor center shrinkage on the specimens. After finishing the growth investigations, these bars were tested for Brinell hardness, tensile strength, chemical analysis and microstructure.

Table II summarizes the results of the growth investigations. It can be seen from these results that copper is a slight inhibitor of growth, boron is somewhat better, vanadium still better, while chromium is a very good inhibitor. Nickel and molybdenum are growth promoters. The combination of nickel-chromium and molybdenum-chromium are, however, growth inhibitors. At each temperature, there are some discrepancies in which an inhibitor alloy showed a greater growth than the base iron, or a promoting alloy showed less growth than the base alloy. This may have been caused by experimental error, or may be a true result of difference in effect on growth above and below the ferrite-austenite transformation. Despite these few discrepancies, the general trend of the results is clearly evident.

Curves in fig. 1 were drawn from the data of table II. Examination of these curves shows that in every case, there is a definite maximum or an inflection of the curve showing the amount of growth, at approximately the eutectoid temperature. In the case of the copper, it is at 1200°F, which is understandable when it is remembered that copper lowers eutectoid temperature.

Chromium, vanadium and molybdenum all raise the eutectoid temperature, and the inflection point of the curves for these alloys occurs at 1300°, 1500° and 1400°F, respectively. In the case of the 1.5 pct chromium alloy there was actually a decrease in length of the specimens at

some temperatures, confirming results obtained by other investigators. The reason for this has not been determined. However, the entire series of irons showed a very pronounced increase in rate of growth after eraching 1600°F.

This change in growth rate at the eutectoid temperature was definitely shown by each of the 26 tests performed (the data represent the average of the two tests for each material). This change at the ferrite-austenite boundary is logical when it is remembered that two different materials are being dealt with.

The growth rate of ferrite is apparently accelerated by temperature, up to the maximum temperature at which ferrite can exist. Above that temperature it is austenite which is growing, and it is found that its growth rate, while it may start lower than that of ferrite, is accelerated by temperature increase until it equals or exceeds the growth rate of ferrite at the transformation temperature. At the same temperatures the growth rate is less in austenite than in ferrite.

It can also be seen that alloys which change the transformation temperature also change the point of inflection and the change in growth rate. Even chromium, which makes the transformation sluggish, depresses the inflection on the curve but does not remove it.

Table III gives the results of the physical tests performed on the various types of iron before and after the growth investigation was conducted. Copper and nickel are known to be ferrite formers, and this is shown in the results. These alloys had little effect on transverse, deflection, and tensile strength, but had a definite effect on hardness. Chromium, vanadium, molybdenum and boron are carbide formers, and their influence as additions can be seen in the table. Molybdenum is a toughener or strengthener, as the results show, producing the highest physical properties in all cases, except for the Brinell hardness. With few exceptions, when the alloy addition increased transverse strength, the deflection and the tensile strength similarly increased. The addition of each alloy increased the hardness over that of the base iron. It is interesting to note that although several measurements were of the order of 200 Bhn and some of the irons contained a large amount of massive

TABLE II

Summary of Results of Growth Tests
GROWTH IN INCHES PER INCH PER HOUR X10⁵

Test Number	Original Length, in.	1000 °F	1100 °F	1200 °F	1300 °F	1400 °F	1500 °F	1600 °F	1700 °F
1	9.001	0.00	0.69	9.03	20.85	15.99	9.03	21.55	45.87
2	9.001	0.00	0.00	33.36	13.90	8.34	9.73	16.68	37.53
3	9.003	0.00	0.00	19.46	25.02	16.68	0.00	0.00	48.65
4	9.003	0.00	0.00	2.78	4.17	6.95	5.56	8.34	26.39
5	9.001	0.00	2.78	0.00	1.39	0.00	0.00	0.00	11.12
6	9.000	0.00	0.00	0.00	0.00	-4.17	-8.34	-8.34	4.17
7	8.995	0.00	0.00	0.00	4.17	0.00	1.39	1.39	20.85
8	8.999	0.00	0.00	0.00	4.17	5.56	12.50	19.46	25.02
9	8.995	0.00	0.00	1.39	9.73	12.50	12.50	15.29	43.09
10	8.999	0.00	0.00	13.90	31.97	13.90	23.63	30.58	72.28
11	8.998	0.00	0.00	0.00	8.34	8.34	9.73	5.56	36.14
12	9.000	4.17	2.78	0.00	15.29	20.85	15.29	22.24	56.99
13	9.001	18.07	1.39	0.00	9.73	15.29	13.90	19.46	54.21

Results shown are the average of two tests in each case.

TABLE III

Characteristics of Irons before and after Growth Tests
(Results shown are the average of two tests in each case.)

Test Number	Type of Iron, %	Physical Properties Before Growth Tests				Physical Properties and Chemical Analysis After Growth			
		Trans. Strength,* psi	Deflection, in.	T. S., psi	Hardness, Bhn 3000 Kg Load	T. S., psi	Hardness, Bhn 3000 Kg Load	TC, %	Si, %
1	Plain	2780	0.37	45,000	232	38,800	197	3.21	2.42
2	2.0 Cu	2755	0.33	46,725	277	29,050	179	3.15	2.16
3	1.0 FeB	2540	0.28	40,775	289	32,025	223	3.20	2.28
4	0.5 Cr	2990	0.37	47,150	248	38,400	222	3.14	2.53
5	1.0 Cr	2610	0.30	45,450	269	40,850	241	3.22	2.62
6	1.5 Cr	2245	1.24	37,825	321	42,800	269	3.35	2.80
7	0.25 Cr + 0.50 Mo	3600	0.41	52,450	285	38,750	232	3.12	2.55
8	0.50 Cr + 1.5 Ni	2795	0.34	47,400	269	38,500	217	3.13	2.49
9	1.0 Cr + 1.5 Ni	2220	0.27	47,400	273	41,900	212	3.16	2.26
10	1.5 Ni	2905	0.37	45,350	255	35,100	199	3.06	2.28
11	0.25 Va	2980	0.35	45,150	269	39,400	212	3.12	2.33
12	0.50 Mo	3745	0.46	58,450	293	39,550	204	3.03	2.23
13	0.75 Mo	3735	0.51	60,400	293	42,700	215	3.00	2.23

* Broken on 18" supports.

cementite, these test bars were all machined on a lathe and threaded on a bolt threading machine with a minimum of difficulty.

Table III gives the results of the tensile strength and Brinell hardness tests together with the chemical analysis for total carbon and silicon, after the growth investigations had been made. In every case except one (that of 1.5 pct Cr) it was found that the tensile strength had dropped. This can be attributed to the decomposition of the pearlite forming considerable ferrite; to the breakdown of the cementite; or to the spheroidizing of the pearlite and cementite.

The hardness dropped in every case, due primarily to the same causes. The reason for the

increase in tensile strength in test No. 6 is that the massive cementite which produced the high hardness mottled iron was changed to a structure containing less cementite, producing a more gray iron with a lower hardness and a correspondingly higher tensile strength.

The chemical analysis was determined from drillings taken from the interior of each test bar. In practically every case a higher total carbon was found in the irons after the growth test. The reason for this has not been determined. In the case of the silicon content, an increase is found as in many cases as show a decrease, probably due to differences in segregation within the test samples.

XERORADIOGRAPHY

A Basic Development in X-Ray Testing

XERORADIOGRAPHY, an all-electric method for obtaining permanent, low cost X-ray images, was the subject of a paper presented at the recent Cleveland meeting of the Society for Nondestructive Testing. The process, described by R. C. McMaster and R. M. Schaeffert of Battelle Memorial Insitute, eliminates film and chemical processing, thus eliminating the usual time delay between exposure and examination.

Contrast sensitivity of Xeroradiography exceeds the 2 pct required for inspection of aircraft parts. The process possesses an unusual local contrast sensitivity which clearly reveals small discontinuities, and definition exceeds 200 lines to the inch.

In preliminary tests of aluminum alloy castings, Xeroradiography required approximately half the exposure of Type M fine-grain film, for comparable images.

The Xeroradiographic image may be transferred and fixed upon any ordinary sheet of paper within a few seconds after exposure. The image may be viewed upon a transparent base, as with ordinary X-ray film, and may also be made a direct positive or a direct negative, as desired.

The plate used in Xeroradiography consists of an electrically conductive backing material, such as a metal sheet or coated glass, the face of which is coated with a smooth layer of a suitable semiconductor sensitive to X-rays. This coating is a nonconductor of electricity, but becomes conductive when exposed to X-radiation. The plate may be used repeatedly for thousands of exposures.

The sensitized plate is exposed beneath the object being radiographed. Wherever X-rays strike the plate, the coating becomes conductive

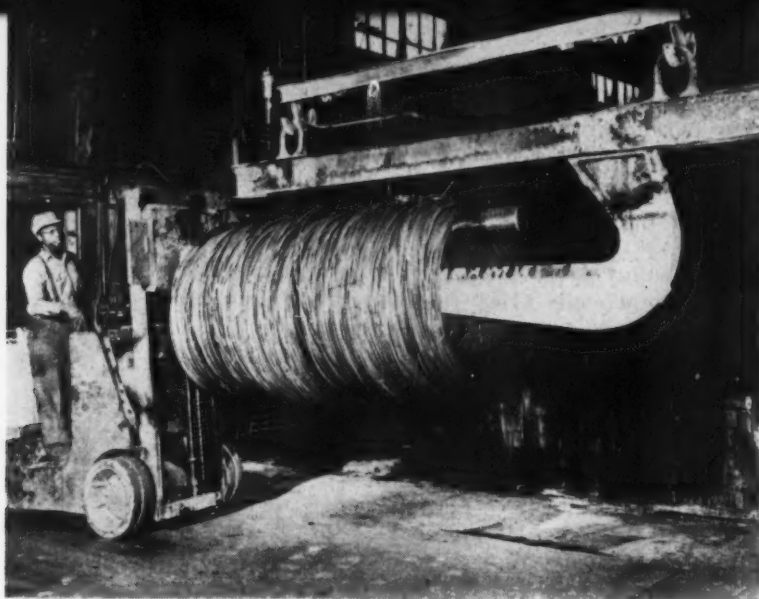
and discharges the electrostatic surface charge into the backing metal, and the X-ray image pattern causes a "latent electrical image" to remain on the plate.

This electrical charge distribution is made visible by flowing specially-prepared dry developing powder over the Xeroradiographic plate. The powder is attracted and adheres to the charged portions of the plate. The irradiated portions of the plate, being discharged, are unable to retain the powder and it rolls off. The result is a positive or negative X-ray image of the object being radiographed. This development may be carried out immediately after exposure, and requires only a few seconds.

The developed image may be viewed immediately for evaluation of the test object. If the Xeroradiographic plate has a metallic backing, the image is viewed by reflected light.

Only a few seconds more are required to make a permanent print from the developed image. This is done by laying a sheet of any kind of paper over the powdered Xeroradiographic plate and passing them through the same electronic charging device used to sensitize the plate. The powder particles are then attracted to the charged paper, which is held in intimate contact with the Xeroradiographic plate by the electric field. By this transfer, the image is restored to its true left-right relationship.

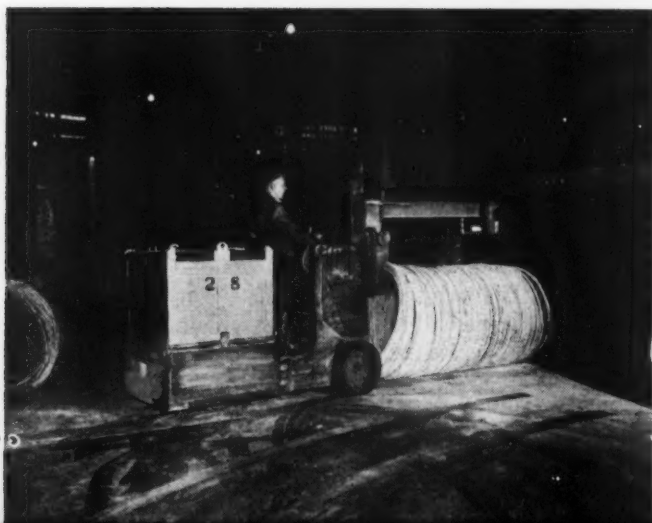
The paper print is fixed by heating for a second or two beneath an infrared heat lamp, or in a photographic dry mounting press. Heat melts the resin powder granules and fuses them to the paper. The printed image is as permanent as a printed page of paper, and can be stored for an indefinite period without deterioration.



The first operation performed by the battery powered ram-trucks is the transportation of coils of raw rod from the storage area to the cleaning area. These coils in the storage area have previously arrived by conveyer from the plant's nearby steel mill. Coils, removed from the conveyer by overhead crane, and stacked into 3600-lb loads, are picked up by a standard ram-type truck. They are then carried to the cleaning department in the wire mill, where the truck operator transfers them to an elongated C-hook that is suspended from an overhead crane as shown here. This overhead crane moves the loads through a series of cleaning and liming baths. As the cleaning operations are completed the loads, still on the C-hooks, are carried away by cranes to transfer cars.

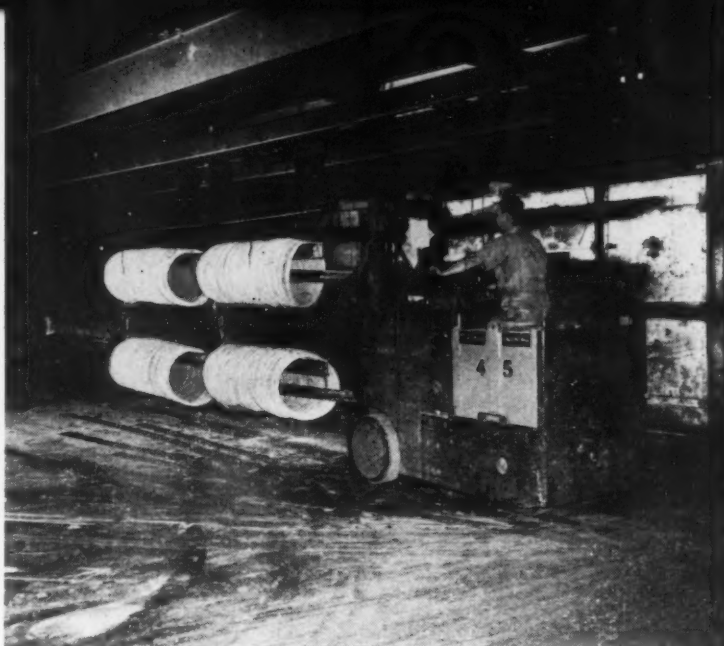
RAM TRUCKS

The loads of coiled wire are taken from transfer cars by a second type of battery powered truck equipped with the C-type ram attachment shown. A loaded transfer car is visible at the right. The next car to the left has just been unloaded. Low-carbon rods are taken directly to stock while high-carbon rods are taken to a normalizing operation and then to stock.



In moving material from stock to the work place area these same C-type ram-trucks are again employed. The trucks pick up the loads from the transfer cars, transfer them to the drawing benches, and hang them up, hook and all, on I-beam racks. Once resting on the I-beam racks the hooks are disengaged from the truck frame and used as material holders at the machines. This places the work within easy reach of the operators, who need only thread the end of each coil through the dies and let it run off the hook. As the hooks become emptied they are picked up by the trucks for return trips to the stock area.

A third type of materials handling truck, equipped with twin revolving rams is shown here. This type is used principally to service a group of normalizing ovens where stresses are relieved in high-carbon rods. This truck is so designed that the operator can pick up one load from the floor on the lower ram, revolve the turntable 180° and pick up a second load, and then thrust both loads at once upon an E-shaped hook hung from a monorail. Coils to be normalized travel through the ovens on the two lower bars of the E-hook while the upper bar of the E is attached to the monorail and suspends the entire assembly. Diameters of incoming rod coils range from 24 to 72-in. diam, so that coils are well suited to ram handling.



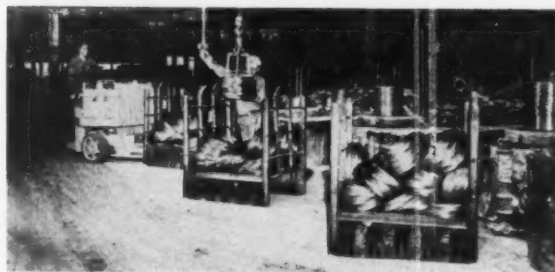
SIMPLIFY COIL HANDLING

AN example of efficient materials handling is the solution of the complex flow plan in the wire plant of the Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. Because of the diverse line of products produced from coiled wire raw stock, the flow of material for each contract takes on a different pattern. Back tracking and criss-crossing are not uncommon in the daily production of wire products that are raw material for plants that manufacture nails, screws, bolts, rivets, springs, welding rods, cotter pins, lock washers, piston rings, chain, wire rope, screens, filters and items of similar nature.

To meet specifications required for each end use, every batch of rod must be channeled through a selected sequence of operations, not all of which correspond with those scheduled for other batches being processed at the same time. These operations may include lime coating, annealing, tempering, electroplating, drawing to various diameters, rolling to special shapes, and packaging in coils or cut lengths to meet customer requirements.

Since practically all the material handled at the plant is in the form of coiled wire, battery powered ram-trucks are used extensively.

The major portion of the complex material flow in this wire manufacturing plant is accomplished by extensive use of three types of ram-type materials handling trucks as described in the accompanying illustrations. In conjunction with the ram-trucks, other materials handling tools such as platform trucks, overhead cranes and grapple hooks are utilized.



When the wire reaches the small-coil stage it becomes more advantageous to handle it in skid racks and on trailers as it moves between operations. For this purpose a number of low-lift platform trucks and tractors are employed. Much of the work of lifting these smaller coils from skid racks to machine spindles is accomplished by power hoists fitted with grapple hooks as shown above. The grapple hooks work on an expanding principle, picking up by expanding inside the coils. Convenient electrical control button makes this a time and labor saving method.

In special cases where the finished product is still in large coils it is transported by a C-hook truck onto the loading platform. From the platform it is loaded onto the gondola cars by an overhead crane equipped with an elongated hook as shown in rear of this photo. The railroad siding runs through the wire mill to permit the use of indoor platform loading and to cut down haulage distances for the battery trucks. As a result it divides the floor area of the mill into two sections. To maintain truck traffic through these two sections, a removable steel bridge spans the rails and connects the platforms on either side.





Victor M. Drury, president of Canadian Car & Foundry Co., Ltd., told ASTE luncheon guests about some of the problems faced by Canadian industry in present day world economics. England, he pointed out, is making a strong bid for Canadian engineering and technical requirements, which in the past have mainly gone to the United States.

Economies

THE 17th semi-annual meeting of the American Society of Tool Engineers was held Oct. 27 to 29 at Montreal before a record attendance. A series of technical lectures covered in the main the theme of quality of production technique and product. At a luncheon on Thursday, Victor M. Drury, president and chairman of the executive committee, Canadian Car & Foundry Co., Ltd., Montreal, addressed the group on "Operating Tools as Used in the United States and Canada." At the semi-annual dinner Saturday evening, the Hon. C. D. Howe, Minister of Trade and Commerce of the Canadian Government, spoke on "Industrial Canada—Today and Tomorrow."

One of the outstanding technical meetings was that held on hot machining.* J. R. Roubik, of the Kearney & Trecker Corp., research dept. spoke on "Milling Hot Workpieces," and Sam Tour of Sam Tour & Co., described "Hot Spot Machining." Mr. Roubik described the further developments of his company in hot milling, showing how the method of heating now employed is limited to the surface of the part rather than through heating. This reduces cutter impact at the surface of the part, yet because the heating is superficial, the metal structure itself is not affected by heating. Actually, the cutter removes practically all of the heated material. Heating is at 1500°F. When the cutter enters the work, this work temperature has dropped to about 1100°F, and the work as it leaves the milling machine is about 200°F. Heating is by gas.

Mr. Tour had new data further bearing out the premise that heating before machining reduces power requirements. It consisted of the results of a series of tests in graphical form showing that as the chip area is increased, the pressure on the tool bit decreases.

The authors described in detail the techniques employed in hot machining, as well as the equipment required for its use. The theory behind the development of the idea was analyzed at the meeting, and an attempt was made to show the

* See also "Hot Milling—Milling High Strength Alloys at Elevated Temperatures," by A. O. Schmidt, THE IRON AGE, Apr. 28, 1949; "Hot Spot Machining at Work Temperatures of 500°, 1000° and 1500°F," by Sam Tour and L. S. Fletcher, THE IRON AGE, July 21, 1949.

of Limited Production

Topic of ASTE Montreal Meeting

potential practical application of hot machining.

The desirability of using special machines for high production v. the necessity of amortizing the cost of such special equipment was the basis of a paper by C. P. Farr, chief engineer of Modern Tools Works, Ltd. entitled, "Special Purpose Machines from Standard Units." The compromise, according to Mr. Farr, is in the use of special machines designed and constructed from standard units that can be salvaged and used to build up new special machines where the first become obsolete. These standard units and unit heads can be obtained for drilling, reaming, tapping, spot facing, and boring, and by positioning them at various radii and angles on a base, a variety of work can be handled. They will replace low cost, limited production, standard machines with production equipment at costs considerably less than straight special purpose machines.

In recognition of the fact that the bulk of industrial companies in the United States and Canada are of small or medium size, one of the meet-

ings consisted of a "Symposium on Limited Production." Economics of limited production were discussed by E. P. Blanchard, general sales manager of the Bullard Co., tools, materials and methods were discussed by J. B. Savits, methods manager of Pneumatic Scale Corp. Ltd., and quality control was the subject of remarks by C. D. Wright, chief engineer, Reliable Toy Co., Ltd. Points brought up at this symposium included the fact that the equipment in a shop will determine the most economical method of production, a more generous national policy with regard to depreciation and taxes is needed, and the small plant faces the problem of acquiring labor of a higher skill than the mass production plant. There is a constant effort to reduce the skill required for a job, and the tool engineer must eliminate unnecessary special tools where possible.

G. M. Foster and G. S. Clarke of the telephone div. of Northern Electric Co., Ltd., headed a session on "Low Cost Tooling, Estimating and



The Right Hon. C. D. Howe, Minister of Trade and Commerce, Government of Canada, told of Canada's position not only as a source of raw materials but as a manufacturer of finished goods. Harry E. Conrad, ASTE executive secretary, is seated at the right of the speaker, and Robert B. Douglas, ASTE president, at the speakers left.

Economics." Mr. Foster discussed "Pre-Design Estimating," and Mr. Clarke covered "Post-Design Estimating." Mr. Foster outlined a logical approach and a systematic method of analysis by which pre-design estimating of tool costs and production costs can be arrived at and which can be used in design to control tooling costs. By the use of Mr. Foster's formula, it was shown that various methods of doing a job could be compared on a cost basis so that the one most economical from every standpoint could be used. He showed how tool costs are tied in with the method of production and with production and operating costs.

Mr. Clarke recommended that machines in a plant be systematically tested to determine their capacity, methods such as in tool grinding be standardized, and the work be charted. Tests can also be made with the different methods of setting up work, clamping it and laying it out with the view of simplification and standardization. The practice recommended for equipment, methods, work setup, etc. was described in detail, with examples of planned layouts, drawings, and breakdown sheets used in conjunction with time standards. How to estimate time required for completion of a tool or machine is based on a careful analysis of individual details. Each operation is estimated, including normal allowances such as getting tools, putting them away, setting up, etc. Thus, if care is exercised to see that there is no waste time between jobs, that the right men are put on each operation, that the correct feeds and speeds that are available on each machine are used, and that unnecessary bench operations are not put on a tool, the tool can be completed close to the pre-design estimate.

Low Melting Point Alloys

Carleton H. Smith, manager of the Montreal branch of Canada Metal Co., in a paper entitled, "Use of Low Melting Point Alloys for Tool and Die Work," described techniques employed and advantages gained from the use of zinc base alloys instead of steel and cast iron in the production of dies for components of such consumer products as electrical refrigerators, stoves, air conditioning equipment, radios, toys, etc. As many as 5000 duraluminum blanks, 1/16 in. thick, have been cut with a single Kirksite die, and stainless steel 0.005 and 0.010 in. thick have been blanked on such dies. The use of Kirksite in the manufacture of such items as spinning blocks and chuck jaws was also indicated. The Cerro alloys, a series of alloys of lead, tin, cadmium and bismuth with melting temperatures ranging from 150° to 300°F, were also described as adaptable to various forming and shaping methods. Preformed and extruded parts, such

as hat sections, channels, and sections with re-entrant angles have been bent to desired radii or contours by first casting the section in a bar of Cerrobend. Where relatively limited quantities of products are required, tooling programs must be inexpensive.

Other discussions at the meeting included papers on mold die hobbing, mold die finishing, surface finish control and standards, calibration of master roughness standards and statistical quality control.

Harry E. Conrad, executive secretary of the American Society of Tool Engineers, indicated that plans were well underway for the coming ASTE annual meeting and exhibition to be held in Philadelphia, Apr. 10 to 14. The theme of the meeting and show will be "Cost Cutting."

Canada Economy Prosperous

The Rt. Hon. C. D. Howe, Minister of Trade and Commerce, Government of Canada, pointed out that today Canada has a healthy, prosperous, well balanced and booming economy. In the past 10 years, production has been tripled in money terms and doubled in real terms. Canadian labor income has tripled, farm income has tripled, and external trade has quadrupled in value and doubled in volume.

Manufacturing capacity growth has been spectacular and industry is well integrated. Canada's manufacturing industries have become important users of one another's products and have gained a greater degree of flexibility of output, not so dependent upon imports. Also, in Canada's 30,000 plants, postwar labor productivity has increased.

One difficult problem, however, the Minister pointed out, was the adverse trade balance with the United States. Either more must be exported to the United States or less will be imported. However, the Canadian Emergency Exchange Conservation Act, providing three classes of import controls, has helped reduce the unfavorable balance of trade by some \$600 million in 1948.

V. M. Drury, president of the Canadian Car & Foundry Co., Ltd., served warning that the British were adopting new measures to lure Canadian business from the United States. He pointed out that Canada will be shortly assaulted by a corps of top-flight British salesmen located permanently in Canada. These salesmen will be supported by warehouses across Canada carrying large stocks of materials so that they can match American deliveries. This project is a real threat to Canadian purchases in the United States, especially in tools, since much business in the past has gone to the U. S. because of faster deliveries.

For a generation, Mr. Drury pointed out, Britain neglected much of the Canadian market because she had plenty of markets elsewhere. Now, with the hunt for dollars, Britain is really going after this business.



Gear Cutting and Testing

Discussed by AGMA

THE American Gear Manufacturers Assn. held its semi-annual meeting Oct. 24 to 26 at the Edgewater Beach Hotel, Chicago. The meeting, highlighted by technical sessions on heavy duty gear testing methods and another on pre-shave gear cutting tools, consisted in the main of further development of standards on the various types of gearing. Involute splines, spur gearing, enclosed gear drives, high speed gearing, gear lubrication, gear blank proportions, cutting tools, and utility gearing were the subjects discussed from the standpoints of practices and standards.

A paper, "Gear Testing Methods for the Development of Heavy Duty Gearing," was presented by R. P. Van Zandt and B. W. Kelley of Caterpillar Tractor Co. In the production of gearing for farm equipment such as tractors, competition has created a demand for basic research and development. The problem of simulating tests and interpreting results in the laboratory forced the engineers into the development of various test machines.

The chassis dynamometer was the closest approach to field tests in the laboratory. The machine is used for such things as an overall check of the power train of a new tractor design or for any particular parts of the drive. It can

be adapted to wheel vehicles although it has been used mostly for crawler tractors.

Another test rig just completed consists of two tractor main frames with gearing, tied down on a base and opposed in such a way that they can be linked by a common track chain connecting two opposed sprockets at one end and two transmission driving shafts at the other end united by a flywheel clutch. Change in torque resulting from wear in gears, bearings, chain, etc., can be determined by this unit.

Several other special types of testing equipment for heavy duty gearing were also devised for checking gearing in agricultural equipment. A machine based upon one of English design was devised for general gear fatigue tests. Load and speed can be varied and controlled, and test gears easily changed. It is so constructed that only the test gears will fail, and inspection can be made with a minimum of attention.

Basically, the machine is two gear boxes connected by couplings, one box housing wide face nitrided precision loading gears and the other box housing the test gears. Loading gears are helical.

These machines are used mainly for fatigue tests with gear pitting or tooth breakage, the kind of failure usually involved. They are de-



F. W. Walker, AGMA president



Leroy Brooks, Jr., AGMA vice-president

signed to take a maximum of 8000 lb tangential loads, and speeds on the driven pulley can be adjusted by variable pitch sheaves on the 15 hp driving motor anywhere from 800 to 2700 rpm.

The authors of the paper described in detail the use of this equipment, instrumentation added to the equipment for accuracy and detail of tests. All of the equipment and test methods described were shown on projection slides.

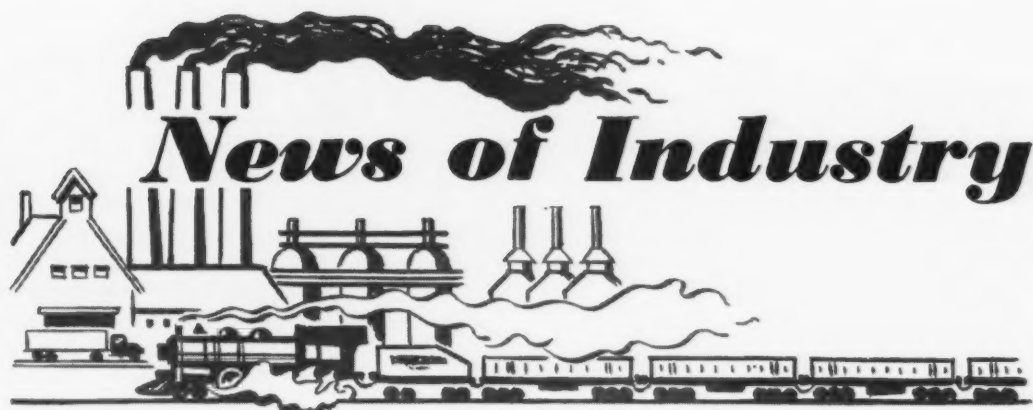
The paper on "Pre-Shave Gear Cutting Tools" was delivered by A. D. Moncrieff, assistant chief engineer, Michigan Tool Co. It was the premise of the author that, where gear cutting is to be followed by gear shaving, it is desirable that pre-shave tools rather than standard tools be used if best results are to be obtained. A pre-shave tool takes into account the location and amount of stock to be removed by shaving and insures a smoothly blended tooth profile. Pre-shave tool design varies according to the number of teeth in a gear, diametral pitch and pressure angle.

If a standard gear cutter is used prior to shaving, the finished gear will either be undercut with a sharp break at the fillet or a step where the shaving cutting has undercut the profile left by the cutting tool. The result will be inaccuracies in the finished shaved gear and

probable reduced life of shaving cutters.

Also discussed were a few points dealing with the machinability of gear steels as related principally to cutting gear teeth. While it is possible to select a more suitable grain structure and hardness for turning, as cutting tools for gear teeth are more costly than turning tools, it is felt economical to favor them. Steels used in gears include SAE 4027, 4620, 3220 for carburizing, and through hardening steels SAE 1050, 1045, 8640, 5145, 4340 and similar grades.

For through hardening steels, a method of annealing to obtain a Bhn between 170 and 190 is recommended. A method of getting this hardness was worked out for gears used in light truck and tractor transmissions. This technique was described by the author and consisted mainly of heating to above the transformation point, holding for 3 hr, and cooling to room temperature. This anneal took no longer than the anneal normally used for this type of steel, yet yielded a much higher degree of machinability, increasing the Shear Speed Tool life, for example, from 150 pieces per sharpening to 350 pieces per sharpening. On checking on turning operations, it was also found that the various tools were making more pieces than previously, but accurate reports on tool life were not kept.



News of Industry



Murray Scores Double Triumph at CIO Meet

Ousting of Communists from CIO and Bethlehem pension agreement recall his promises of a year ago ... Industry shudders at the cost—By BILL PACKARD

Cleveland — Philip Murray is feeling pretty good. In a single week he has won two of the biggest victories of his career as president of the CIO and the United Steelworkers of America. He broke the industry front in the battle of pensions and he scored a smashing victory over the Communists in the national CIO convention here.

Those in management who have long respected him as a responsible labor leader are glad he is still labor's top man. But they shudder to contemplate the cost of his victory to their companies.

Recalls Former Promises

The events in Cleveland this past week are the results of aims and strategy outlined in a similar convention just a year ago in Portland. At that time Mr. Murray did three things: (1) He called for outright repeal of the Taft-Hartley Law. (2) He served notice that the fourth round economic battle would be fought on social security and pensions. (3) He delivered an ultimatum that Communist elements must leave or face expulsion from the CIO.

He lost his fight to repeal the Taft-Hartley Law. But one year later he achieved climactic victory on the other two points. The timing could have hardly been better. A great many of the delegates attending the convention in Cleveland were also present in Portland a year ago.

Later in the week some of the edge was taken off the Bethlehem

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Republic Strike Ends

Pittsburgh — Republic Steel Corp. signed with the steelworkers union a few hours after Jones & Laughlin's strike ended but return to full production depends on coal. A Republic spokesman said the company has only 3 week's supply.

The pact signed here Nov. 8 is similar to the Bethlehem pattern on pensions. On insurance, Republic will continue paying 3½¢ per hr and workers will pay 2½¢. Benefits of the new pact will go to all employees—including those not in bargaining units—except those covered by an existing pension plan.

Schedules Metal Powder Show

New York—The Metal Powder Assn., sponsors of the annual Metal Powder Show, report that the 1950 show will be held in Detroit, next Apr. 25-26, at the Book-Cadillac Hotel. The Metal Powder Show is an exhibit of the latest products and developments of producers of metal powders, fabricators of parts made from metal powder, and manufacturers of equipment used in powder metallurgy.

Keynote—One Year Ago

New York—The following remarks of Philip Murray, president of CIO and USWA, before the CIO convention in Portland last November were prominently displayed in an *Iron Age* feature story Jan. 6, 1949, p. 189:

"... There are other matters to which we must necessarily direct our attention, and that is that in the field of collective bargaining we must make social insurance and pensions an issue in each collective bargaining conference with employers.

"... These corporations... have definite social obligations which run to the people, and they must now begin to realize the necessity of assuming those obligations, sensing those responsibilities and meeting the representatives of those unions of ours in a spirit of amity and good will and giving ample recognition to the institution of decent social security programs and pensions for all workers employed in American industry."

Murray Scores at CIO Meeting

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triumph when it became apparent that there would be no stampede of other steel firms to sign quickly on this pattern. Labor leaders still expressed confidence that this would become the basis for settlement. But they were denied the satisfaction of getting the names on the dotted line while the convention was still in progress.

Pensions and social insurance are some of the unfinished business which has been barring any thought of retirement from Mr. Murray's mind. Now his own success in leading that fight might bar him from stepping down.

The case against the Communists has been brewing for a long time. Mr. Murray has always recognized that he could not afford to permit them to infiltrate his union. He warned them in Portland a year ago. The machinery for their expulsion from the CIO was already turning before the delegates arrived in Cleveland last week.

J&L and Union Reach Settlement, 25,000 Resume Work

Pittsburgh—Climaxing a week of negotiations, Jones & Laughlin Steel Corp. and the CIO United Steelworkers of America early Tuesday signed a pension-social insurance agreement ending the strike of all plants and iron ore mines of the company.

The contract was signed about 12:30 a.m. in the office of USWA president Philip Murray after more than 10 hr of give-and-take by company and union attorneys on the wording. Some 25,000 J & L workers began work immediately.

Differing only in detail from the "pattern" contract between Bethlehem Steel Corp. and the union, the agreement provides for \$100-a-month minimum pensions for employees with 25 years of service at 65, and \$80 for an employee with 20 years service.

The pension program will continue unchanged for 5 years, but the company reserves the right to cancel at the end of 2 years. Details of the pension program must be completed by June 1, 1950, but provisions will be retroactive to Jan. 1, 1950.

A social insurance program, details of which have not been worked out, will cost a total of 5¢ per man-hr, with employees and the company splitting the cost. The plan will become effective Jan. 1, 1950.

Other provisions of the present contract will continue in effect for 2 years, with either party reserving the right to reopen for the purpose of revising wage rates Dec. 31, 1950.

Rotary Electric Signs for 13¢

Detroit — Application of the Bethlehem formula has broken the month long deadlock between Rotary Electric Steel Co. and the United Steelworkers, CIO.

The new agreement provides for a 13¢ an hr wage package, including pensions and insurance paid for by the company.

Following ratification of the

new agreement by 500 production workers, Rotary was able to call its workers back on Nov. 3.

Meanwhile, a successful conclusion of the negotiations between Great Lakes Steel Corp. and the USW (CIO) is anticipated. It has been announced by a union spokesman that Great Lakes is studying a proposal similar to the pact made by the union with Bethlehem Steel Corp.

Lukens Steel Settlement Differs Some from Bethlehem's

Coatesville, Pa.—The Lukens Steel Co. plant was getting back into production this week following union approval of the terms of a new contract. The settlement provides for a minimum pension payment by the company of \$70.41 per month for an employee who has reached 65 with 20 years' service. Social security payments in addition to the pension will bring the total pension to \$100 per month or slightly higher. There will be a payment of \$10 a month additional for employees retiring after 40 years' service.

The social insurance program calls for a company payment of 62.5 pct and an employee payment of 37.5 pct, averaging 3¾¢ and 2¼¢ an hr, respectively. The insurance plan goes into effect Dec. 25, 1949, and in the meantime details of coverage, cost of insurance, etc., will be on a monthly basis, with each hourly rated employee paying the same amount.

Detroit Steel Proposes To Purchase Portsmouth Steel

Detroit—Subject to ratification by the boards of directors, Detroit Steel Corp. will acquire the physical assets and steel business of the Portsmouth Steel Corp., Portsmouth, Ohio. The directors of both companies will meet within the next few weeks to vote on the proposed purchase agreement.

The purchase price which is based on book values at the purchase date was not announced. Payments will be made partially

in cash and partially in Detroit Steel Corp. common stock.

Detroit Steel Corp. operates cold strip mills at Detroit and New Haven, Conn., having a capacity of 210,000 tons. Processing and distribution of flat-rolled products is through its Reliance Steel Div. with warehouses at Detroit, Cleveland, Chicago and New Haven. The company also operates a general steel warehouse in Detroit, Craine-Schrage Div., specializing in hot-rolled and cold-drawn carbon and alloy bars and tool and die steels.

Describes New Equipment

Avery Adams, vice-president of Portsmouth, said that his company hopes to complete installation of a new electric weld pipe mill and a 54-in. hot strip mill within the next 10 months. Preliminary bids on these projects are in, but no contracts have been closed.

The electric weld pipe mill, it is planned, will produce sizes from 4 to 16-in. in diam, primarily for oil country line pipe and casing. Projected sales amount to about 200,000 tons a year.

The hot strip mill, as it is now planned, will have a minimum of four stands, possibly more. Capacity is expected to be more than adequate to accommodate the approximate 40,000 ingot tons that will be available monthly for rolling. Ingot capacity of Portsmouth is 60,000 tons monthly, but some 20,000 tons of this will go into production of wire products. The strip mill also will produce skelp for the pipe mill.

Projected annual sales also include 144,000 tons of merchant and manufacturers wire and 36,000 tons of tie plates. It is expected that sales of cold-rolled strip of the two companies will amount to 210,000 tons a year.

The Portsmouth-Detroit Steel tieup was viewed as an ideal arrangement, since the production facilities of the two companies complement each other. This provides an outlet for Portsmouth's excess semi-finished capacity.

Steel Actuaries Burn Midnight Oil

Bethlehem settlement followed by feverish reshuffling of figures . . . Host of variables makes job of detailed recommendations staggering—By D. I. BROWN

Chicago — Bethlehem's settlement last week put all actuaries of the other steel companies on extra shifts. They worked night and day over their tables, slide rules and crystal balls and within 3 days most of them came up with some figures. The only trouble was that some came up with as many as three sets of figures—all different. This is what has delayed settlements by other steel producers.

By midweek they were comparing notes via telephone, examining their tea leaves and trying to figure (1) "What are the exact details of Bethlehem's plan, (2) is it equitable in our case, (3) can we do the same thing, and if so how shall it be funded?"

Faced With Complex Job

Actuaries are confronted with so many variables, each of which is different for every company, that their job of recommending settlement details to management is

staggering. The average age of their workers or groups of workers is important. This must be tabulated as well as the actual number of employees in each bracket. The entry age of all present employees into such plans as their eligibility must be predetermined.

Each of these factors affect the broad settlement in a host of ways. Management is asking their actuaries to run up tabulations showing how the payment should be handled, "Shall we fund the moneys which must be laid aside or can we adopt a pay as we go plan?" "If funded, how much will we be forced to lay aside and when?"

Withdrawals by members over the years is another problem. Will the employee have a vested interest or will it mean that if he quits or dies or gets fired before retirement that the employee gets nothing? If it is worked this way, how much will such funds already laid aside earn?

Funding Poses Big Problem

In funding alone the possible plans are numerous and this requires long study—not a hasty board of directors meeting. No large company without a previous

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Puts Up Funds for Italian Firm

Washington—The Economic Cooperation Administration has approved the use of \$1.4 million in Marshall Plan money for assistance in modernizing an Italian ball and roller bearing factory.

The firm, RIV Officine di Villar Perosa, will put up the equivalent of \$700,000 toward replacement of worn and obsolete machinery and equipment. All new equipment will be American-made.



"For the last time Benson—get glasses or be transferred to another department."

Steel Companies Report

New York—In addition to steel earnings reported in last week's issue of *THE IRON AGE*, the financial statements of the following concerns have also been received:

Sharon Steel Corp., for the third quarter of this year, reported a profit of \$120,519, compared with \$2,836,500 in the similar period of last year. Earnings for the first 9 months of this year were \$3,543,311, compared with \$6,614,230 for the like 1948 period.

Wheeling Steel Corp. reported a net profit of \$2,139,664 for the third quarter of this year, compared with \$3,866,913 for the like 1948 period. Profits for the first 9 months of this year amounted to \$8,278,233, compared with \$9,691,645 for the corresponding 1948 period.

Pittsburgh Steel Co. reported a deficit of \$466,157 for the third quarter of this year, compared with a profit of \$2,167,804 for the similar period of 1948. Earnings for the first 9 months of this year were \$1,972,285, compared with \$3,892,780 in the corresponding period of last year.

Granite City Steel Co., for the third quarter of this year, reported earnings of \$628,047, com-

pared with \$776,333 for the like 1948 period. Earnings for the first 9 months of this year amounted to \$2,223,514, compared with \$2,410,650 for the 1948 period.

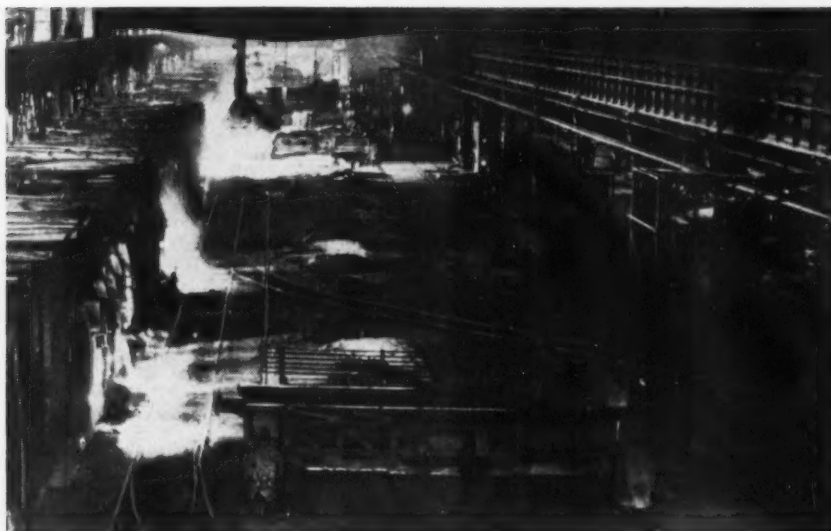
Allegheny Ludlum Steel Corp. reported a loss of \$183,341 for the third quarter of this year, compared with a profit of \$1,492,157 for the corresponding period in 1948. Net earnings for the first 9 months of this year were \$1,376,659, compared with \$4,423,972 in the like 1948 period.

Barium Steel Corp., for the third quarter of this year, reported a loss of \$12,681, compared with a profit of \$841,197 for the corresponding quarter of 1948. Net earnings for the first 9 months amounted to \$1,107,927, compared with \$2,057,307 for the similar period of 1948.

Bliss & Laughlin, Inc. reported earnings of \$228,183 for the third quarter of this year, compared with \$365,000 for the corresponding 1948 period. Earnings for the first 9 months of this year amounted to \$927,764, compared with \$987,000 for the like 1948 period.

Carpenter Steel Co. reported net earnings of \$217,783 for the third quarter of this year, compared with \$522,508 in the corresponding period of last year.

WORLD'S RECORD OPENHEARTH SHOP: This openhearth department of Weirton Steel Co. last month established a new world's record for steel production by 12 stationary openhearth furnaces with an output of 200,379 ingot tons. Best previous production was 182,722 ingot tons also turned out by Weirton in March 1949.



Steel Actuaries

Continued from Page 113

pension plan and therefore without provisions already made or funds already in process of accumulation, can fund all the necessary money immediately or even within a few years.

Mr. E. M. Voorhees, chairman of the finance committee of U. S. Steel Corp., before the Presidential steel board on Aug. 22 stated, "If U. S. Steel annually sets aside in respect of past service the same amount as the \$42½ million required on account of future service, it would take the company about 35 years to catch up with the liability for past service costs." This statement was made in regard to the full union demand at that time.

Large Liability Incurred

If other steel companies sign up on the same basis as the Bethlehem settlement, their balance sheet will take on a new look if a recent SEC ruling is adopted. SEC has proposed that such funds be shown somewhere on the balance sheet. The liability which they immediately incur when signing such an agreement amounts to many millions. Mr. Voorhees has estimated U. S. Steel's total liability would be in the neighborhood of one billion dollars.

Bookkeeping Problems Seen

If the SEC proposal goes through, and the companies must show this item on their balance sheets, some corporations on paper would overnight appear to have become insolvent. Any amounts already funded, according to the SEC proposal, must also be shown on the balance sheet as an asset.

In the effort to ease the pain to all involved, union, unemployed workers and themselves, Inland Steel Co. on Nov. 1 proposed to the union "Put the men back to work while we bargain." The union replied that if Inland accepted the Bethlehem plan they

would agree. Inland didn't accept this counter offer, saying to do so "would preclude genuine bargaining."

Inland's Problem Simpler

Inland's problem is much simpler than that of many other companies. The company has had pensions and insurance plans going for years. About 75 pct of the required money to sustain their present plan is already funded at Inland. But even then, their problem is first to know what Bethlehem's settlement is in detail and then decide which of their sets of figures are similar to it. Then they can determine what it will cost their employees and their stockholders and if it is equitable or possible to carry out the plan.

Inland in a letter to all employees on Nov. 2 said, "Bargaining on the complex problems of pensions will take time. . . It may take several weeks. We don't think you should lose work while we bargain."

On Nov. 3 the union agreed to meet and at 10:00 a. m. Saturday they sat down with company representatives to bargain.

This meeting did not produce any results as the union merely turned down Inland's formal request to return to work and bargain over pensions. Inland officials told IRON AGE on Monday that they would make a definite offer very soon and see what happens.

International Nickel Gets Two Patents on Ductile Iron

New York—International Nickel Co. has been granted two patents covering their work on magnesium treated cast iron, usually called ductile iron. The patent numbers are 2,485,760 and 2,485,761.

The company has been licensing its process to foundries for some time. In a speech last week before the Gray Iron Founders Society in Chicago, Donald Reese of International Nickel Co. said he believes that commercial production of ductile iron in 1950 will amount to significant figures. But he cautioned that we do not have all the answers yet.

Fabricators See Much Building Overdue

Annual convention adopts educational plan of 10 annual college scholarships of \$1000 each . . . Corridor talk reveals concern over fierce price competition.—By GEORGE F. SULLIVAN

White Sulphur Springs, W. Va.

—A lot of badly needed steel construction has not yet begun to appear on the books but fabricators attending the 27th annual convention of the American Institute of Steel Construction here last week were somewhat optimistic. There was a strong undercurrent of resentment at the price cutting now going on in the industry but the general business tone was far more optimistic than it would have been 6 months ago when steel fabrication hit a post-war low.

Most important action of the meeting was establishment of a college education plan under which the institute will award 10 annual scholarships of \$1,000 each, with indications that scholarships given by individual companies may bring the total above 40 a year. The program is largely the work of last year's president, Thomas R. Mullen, president, Lehigh Structural Steel Co. His theory is that as private gifts to colleges fall off it is industry's job to help supply funds. Either that

or face federal gifts and federal control. The acting president of Cornell University, Dr. Cornelis de Kiewiet, who made the principal address at the convention, expanded on this theme in describing "The Obligation of Industry to Education."

Strike Pinch Described

The Bethlehem strike settlement came on Oct. 31, the first day of the meeting at the Greenbrier Hotel here. To most of the fabricators it meant hope of averting shutdowns which institute president N. R. Patterson, Tulsa, Okla., predicted would otherwise halt all steel erection by Dec. 1.

For while several of the biggest fabricators were struck on Oct. 1, most of the rest of the industry was able to stay on the job. They drew on inventory and substituted where they had to.

Because of the recession that kept fabricated structural steel bookings for the first 6 months of 1949 some 27 pct under the same 1948 period, steel mills were practically current on standard

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BANQUET: Speakers and their wives at dinner of the American Institute of Steel Construction at the Greenbrier. In the party are institute president N. R. Patterson (extreme left); Erwin P. Stupp, St. Louis; Dr. Cornelis De Kiewiet; Maj. Gen. L. J. Sverdrup; and L. Abbott Post, executive vice-president of the institute.



INDUSTRIAL SHORTS

PRIZE WINNER—Joseph J. Westerfield of Philadelphia, a grinding machine operator to whom "better production means a higher standard of living," has been named winner of a company-wide essay contest conducted by SKF INDUSTRIES, INC. Mr. Westerfield was awarded a \$150 first prize.

VICTOR BUYS—Mills Alloys, Inc., Los Angeles manufacturer of blasting nozzles and tungsten carbide hard - surfacing rods, has been purchased by the VICTOR EQUIPMENT CO., San Francisco. Mills Alloys will be known as the Alloy Rod & Metal Div. of Victor Equipment.

PARTNERSHIP—Bernard Lester, Frank W. Hankins and John A. Silver have formed a partnership, LESTER, HANKINS & SILVER, with offices in New York and Philadelphia for the purpose of helping builders and distributors of machinery, equipment and technical products in their management, distribution and sales problems.

AUCTIONS PLANT—The Birmingham plant of RHEEM MFG. CO. has been purchased at auction by Louis Greenspon, St. Louis, for \$150,000. The company is retaining a warehouse and sales office at Birmingham.

PURCHASE—The manufacturing rights and facilities of the Sterling Electric Tool Products Co., Chicago, has been purchased by the PORTER-CABLE MACHINE CO., Syracuse, N. Y., for the production of the Sterling portable electric and pneumatic sanders.

MORE ROOM—New office headquarters and manufacturing plant at 5107 Pacific Blvd. in Los Angeles has been opened by AMERICAN DRILL BUSHING CO. Storage space is provided for maintaining complete stocks of bushings for immediate delivery.

NUMBER EIGHT—Lobdell Co., Wilmington, Del., manufacturers of paper mill machinery and Nazel forging hammers, has been acquired by UNITED ENGINEERING & FOUNDRY CO., Pittsburgh. It will be a wholly-owned subsidiary known as the Lobdell United Co. and is the eighth company owned outright by United.

HONORED—Carl B. Post and George V. Luerssen of the Carpenter Steel Co., Reading, Pa., were awarded a certificate of merit by the AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS for their work in developing a new method for melting better steel.

ACQUISITION—The Pickering Governor Co., Portland, Conn., manufacturer of governors, has been acquired by the Henry & Wright Div. of HARTFORD-EMPIRE CO., Hartford. Charles B. Taylor will continue as sales engineer of the Pickering line.

SERVING AGAIN—Herman Caplan, M. W. Singer & Co., Pittsburgh, has been re-elected president of the Pittsburgh chapter of the INSTITUTE OF SCRAP IRON & STEEL, INC. Also re-elected were Samuel M. Goldberg, vice-president; Robert M. Jacobson, treasurer; and Paul H. Stocker, secretary.

ADDING—Wigton - Abbott Corp., Plainfield, N. J., has been awarded a contract by INTERNATIONAL PLAINFIELD MOTORS, subsidiary of Mack Trucks, Inc., for the design and construction of a large modern addition to its present manufacturing plant in Plainfield.

CHUCK AGENT—The Whiton Machine Co., New London, Conn., has announced the appointment of ANDERSON & WHITE SUPPLY CO., 2910 West Armitage St., Chicago, as its agent to handle the sale of lathe chucks and centering machines.

Much Building Overdue

Continued from Page 115

structural shapes when the strike started. However, they were more than 2 months behind on wide flange beams. From talks with steel mill sales officials, fabricators concluded that standard shapes would be short and on quota for about a month, and wide-flange beams for 3 to 4 months. Plate promises to be tight too.

Inquiries Reported Better

Most fabricators say inquiries have picked up in the past few months and many promise to turn into contracts. It was felt that if business showed some stability during the next few months more jobs would be awarded. As executive vice-president L. Abbett Post pointed out, any fabricator who has been able to keep his head and not lose his sense of values this year is to be commended.

Looking ahead there is, as Mr. Patterson noted, a national shortage of hospital, school and church buildings. The Tulsa, Okla., fabricator and warehouseman was re-elected president for a second term, along with all the other officers of the institute. Three new directors were chosen: James M. Straub, Fort Pitt Bridge Works, Pittsburgh; Buckley Dietrich, Dietrich Bros., Baltimore; and Earl V. Grover, Apex Steel Corp., Los Angeles.

Asks Practical Safety Program

Mervyn G. Gaskin, president, Taylor & Gaskin, Inc., Detroit, gave a hard-hitting safety talk. He described deaths and injuries due to carelessness, contrasting them with accounts of how lives and money had been saved. He told what has been done in Detroit to reduce accidents and lower insurance costs.

Dr. de Kiewiet told the institute members that the United States was arousing the hostility, suspicion and resentment of the intellectuals of Europe and will have sacrificed European aid money in vain if it cannot win an

influential proportion of these people to our standards.

How to move 70,000 yards of earth in 10 days and build an airstrip for less than \$360 were part of a talk by Major Gen. L. J. Sverdrup, who in a more serious vein advised against smugness over our development of the atom bomb. In many ways Europe is ahead of us in engineering, he warned. The former commanding general of General MacArthur's engineer troops, and now president of Sverdrup & Parcel, St. Louis, entertained with color movies of airstrip construction in New Guinea early in the war.

Unemployment Compensation Claims Climb to New Highs

Washington—New claims for unemployment compensation continued to pile up last week as the effects of the coal and steel strikes spread to secondary industries.

For the week ending Oct. 22, new claims rose by 44,800, according to the Bureau of Employment Security. At the same time, continued claims continued to increase as continued stoppages dimmed hopes of laid-off workers for an early recall to their jobs.

New claims for the week totaled 326,900, the highest since July, while continued claims reached new heights of 1,921,000 for the nation.

ECA Funds for Italian Refinery

Washington—The ECA will put up \$2 million in Marshall Plan funds for assistance to Italy's IROM, oil refining facilities for engineering fees and special equipment to modernize the plant.

Estimated cost will be about \$6.4 million and will expand the present production from the present 520,000 tons annually to 1.1 million tons. The output will service Adriatic cities.

Equipment to be purchased in the United States will include distillation and filtration units, generating unit, and equipment for both truck and tank car loading.

Destination Controls Placed on Strategic Items

Washington—Additional destination controls have been placed on several types of iron and steel mill products, numerous types of machine tools, mining machinery, refining equipment and nearly 100 other strategic commodities for which security controls are considered necessary.

This means that validated export licenses will be required for shipment of these products to all destinations outside the U. S. except Canada.

At the same time, about 50 commodity classifications of non-strategic nature and in long supply have been dropped from the positive list. These include bauxite, platinum ores, portable electrical tools, and varied types of electrical apparatus.

The complete list of commodity classifications affected by the actions will be carried in the current export bulletin, obtainable at field offices of the Commerce Dept.

Sawyer Says Business Is Good And Should Continue So

Chicago—Secretary of Commerce Charles Sawyer reported on his personal fact finding survey of business and employment conditions in various sections of the country to a joint meeting of the Chicago Assn. of Commerce and Industry and the Illinois Manufacturers Assn. at a meeting held here on Nov. 2.

Mr. Sawyer told the assembly "business is good and I see no reason to think it will not continue good." He said that he has found three major things that have developed which should be carried out to benefit business. They are: Reduction in excise taxes, higher depreciation allowances, and no government artificial respiration programs are wanted or needed at this time.

Mr. Sawyer declared that one of the most serious problems facing us today is our \$5 billion imbalance in international trade.



Dates to Remember

Nov. 10-11	National Foundry Assn., annual meeting, New York.
Nov. 17-18	National Machine Tool Builders Assn., fall meeting, White Sulphur Springs, W. Va.
Nov. 27-Dec. 2	American Society of Mechanical Engineers, annual meeting, New York.
Nov. 28-Dec. 3	Exposition of Chemical Industries, New York.
Nov. 30-Dec. 2	Society for Experimental Stress Analysis, annual meeting, New York.
Dec. 4-7	American Institute of Chemical Engineers, national meeting, Pittsburgh.
Dec. 7-9	National Assn. of Manufacturers, 54th Congress of American Industry, New York.
Dec. 8-9	American Institute of Mining Engineers, annual conference, Pittsburgh.
Dec. 8-10	American Institute of Mining & Metallurgical Engineers, Electric Furnace Steel Committee, annual conference, Pittsburgh.
1950	
Jan. 9-13	Society of Automotive Engineers, annual meeting, Detroit.
Jan. 15-19	Associated Equipment Distributors, annual meeting, Chicago.
Jan. 16-18	Truck-Trailer Manufacturers Assn., annual convention, Edgewater Park, Miss.
Jan. 20	Malleable Founders' Society, semiannual meeting, Cleveland.
Jan. 22-24	Institute of Scrap Iron & Steel, Inc., annual convention, Washington.

C. W. Holmberg Elected President Tool & Die Assn.

New York—The National Tool & Die Manufacturers Assn., held its annual convention at Hotel Statler, Oct. 30 through Nov. 2. Centre W. Holmberg, president of Aug. W. Holmberg & Co., Inc., New York, was elected president of the NTDMA group for 1950.



Centre W. Holmberg

At the Tuesday luncheon meeting L. R. Boulware, vice-president in charge of employee relations of the General Electric Co., spoke on "Management on the March," pointing out that businessmen must sell employees on the factors involved in their particular jobs just as they sell their customers. He declared that in order for American industry to put a halt to the trend toward socialism its employees must be

made to understand the importance of their position in our free enterprise system.

E. Slater, of Slater & Crabtree, Ltd., Wakefield, England, a leader of the Conservative party and former mayor of Wakefield, pointed out that America is 20 years ahead of Britain because there is more opportunity in America. The lack of a mass market in England forbids the extensive use of high production tools. He also stated that the U. S. is ahead in the use of progression dies but mentioned the British lead in the deep-stamping processes and pointed to the many orders his firm has from Brazil and Rio Janiero.

Receives Italian Mill Order

New York—E. W. Bliss Co. has received orders for rolling mills for Italy under the Marshall Plan in the amount of \$1.3 million. The equipment is for the cold-rolling of steel sheets.

Bliss has just recently received, outside of the Marshall Plan, an order for an aluminum mill for Switzerland.

Export-Import Loan Granted Bethlehem's Chile Ore Company

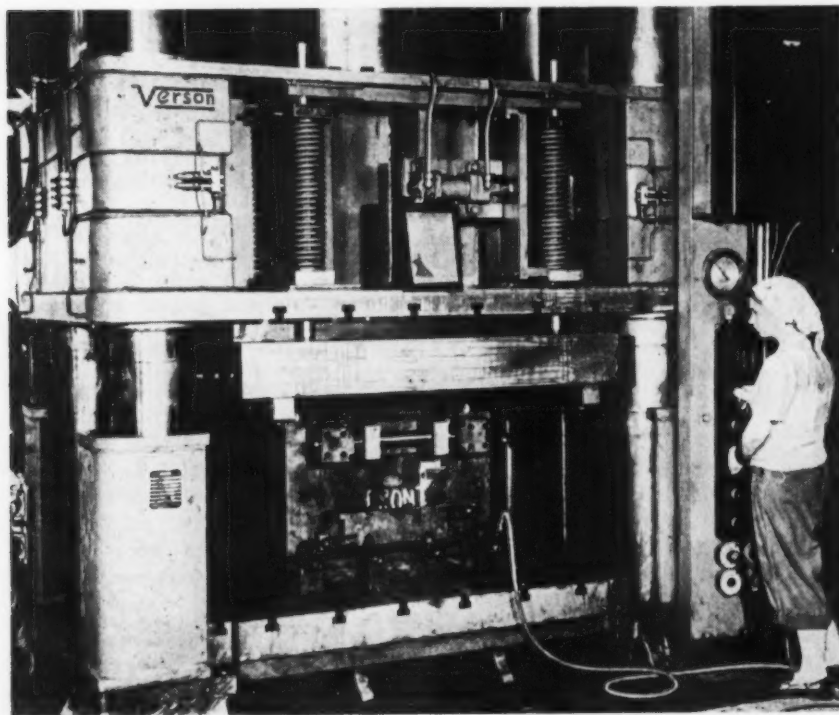
Washington — The Export-Import Bank has agreed to loan \$2,750,000 to a Chilean company for development of an iron ore deposit expected to produce about 1 million tons of ore annually.

The ore deposit, known as El Romeral, is owned by Bethlehem Steel Co. Bethlehem has agreed to put up two-thirds of the estimated \$8,250,000 needed to construct a railroad and dock facilities, with the Export-Import Bank supplying the remaining one-third.

The Chilean company, Corporacion De Fomento De La Produccion, has agreed to spend the credit in the U. S. on railroad, dock, and construction equipment.

Bethlehem engineers estimate El Romeral reserves — located near Coquimbo — at about 20 million tons of ore bearing 60 pct or more iron. Under the provisions of the loan, the company will operate the mine. The port to be built at Guayacan Bay, and the trains hauling ore from the mine to the port. One-third of the annual output of ore will be used by the new integrated steel plant at Concepcion, Chile, and two-thirds will be exported by Bethlehem to its plant at Sparrows Point, Md.

ALL OUT FOR TV: This new press in the plastics division of General American Transportation Corp. plant at Indiana Harbor, Ind., produces 11 table model TV cabinets an hr. Initially the 1200 ton press, made by Verson Allsteel Press Co., Chicago, was slated to make plastic washing machine agitators. When the buying public decided they wanted TV sets in preference to washing machines, GATX obligingly pitched in to help them.



Meehanite Corp. Holds Symposium on Nodular Iron

Cleveland — A symposium on nodular iron highlighted a meeting of licensees of the Meehanite Metal Corp. held here last week. Included in the symposium were discussions of various nodularizing agents, welding characteristics and engineering properties of nodular Meehanite, and industrial applications of this metal.

Officials of the Meehanite Metal Corp. reiterated* that Meehanite licensees are authorized to produce nodular iron under the terms of the regular Meehanite license agreement. Several Meehanite licensees were reported to be producing nodular iron castings.

*See The Iron Age, Oct. 13, p. 100.

Over 1000 Attend 50th Annual NMTA Convention

Industrywide bargaining seen as a monster . . . Federal Taxes threaten.

Chicago — Before a luncheon meeting of the National Metal Trades Assn. 50th annual convention held here at the Palmer House, Major General Henry B. Saylor, assistant chief of ordnance, United States Army, declared that titanium metal is the most promising new material which can be used in the guided missile field. It will permit a 40-per cent weight saving, he said. General Saylor described rockets and guided missiles to the group and said that this country's research in this field started where the Germans left off. He added, "We have the best German rocket men here, Russia didn't get all of them."

Thomas J. Morton, Jr., president of NMTA, in his keynote address told 1000 industrialists that the spread of industrywide bargaining is a "Frankenstein monster which eventually will destroy its creators and wreck havoc with both industry and labor." He said that the demand for fringe and other nonproductive items that may be absorbed in larger companies will bankrupt small and medium sized firms.

Standard Steel Spring Ads

Willard F. Rockwell, board chairman of Standard Steel Spring Co., reported the results of his company's full page newspaper ads on the American system. He cited their amazing readership and told the association that the public was hungering for the economic facts of business.

Father Edward A. Keller, Notre Dame economist, told the group that federal taxes rather than unfair competition by giant corporations "constitute the greatest threat to small business." He said that government tax policies have hit very hard the smaller businesses which predominate in the metal trades industry. He called upon the federal government to revise the tax structure, forget its attack on big business, and con-

REELECTS

Chicago—The top three executives of the National Metal Trades Assn. were reelected for a second term in 1950 at the concluding session of the NMTA's convention held here Oct. 28. The three were Thomas J. Morton, Jr., president, Hoosier Cardinal Corp., Evansville, Ind.; Joseph L. Kopf, president, Jabez Burns & Sons, Inc., New York, and Philip M. Morgan, president, Morgan Construction Co., Worcester, Mass. These men hold the offices of president, first vice-president, and second vice-president and treasurer, respectively, of the NMTA for the next term.

centrate on the elimination of waste and extravagance of "big" government by adopting the recommendations of the Hoover report.

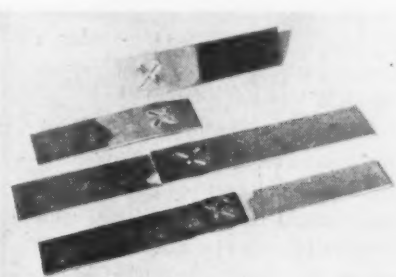
Cold Welding Process Requires No Heat; Only Pressure

New York — Welding of aluminum and other nonferrous metals by pressure at room temperature, as developed by General Electric Co., Ltd., England, is being introduced into this country by the Koldweld Corp., 10 E. 40th St., New York.

This process*, which requires no

* See "Cold Welding Aluminum," THE IRON AGE, Aug. 19, 1948, p. 84.

heat, is said to be applicable to aluminum, duralumin, cadmium, lead, copper, nickel, zinc and silver. At present chief emphasis ap-



COLD WELDING: Shown are strip joints of aluminum (center) and aluminum welded to copper (lower) by the Koldweld process, which uses pressure but no heat. The top pieces show where tear takes place. The Koldweld Corp., New York, has patented the process.

pears to be in aluminum welding.

The Koldweld Corp. plans to issue nonexclusive licenses in the United States, according to William Dubilier, president. Applications of the process in England have included containers and bellows required to be pressure tight, as well as various electrical components.

Maximum thickness of aluminum cold welded on a practical basis to date is about 1/4 in., according to Mr. Dubilier. Experimental work is progressing on welding nonferrous metals and while it appears that this is feasible it is too early to discuss results, he said.

In the cold pressure process, the metal is made to flow away from the welding point as the welding tools are brought together. No heat is required. Three types of welds have been thus far evolved—the straight weld, the ring weld and the continuous seam weld.

Tools required for this process are extremely simple and in many cases can be portable. However, the shape and size of the welding die were said to be very critical.

Paid Vacations Show a Gain

Washington — Better than nine out of every 10 (93 pct) collective bargaining agreements now contain provisions for paid vacations, according to the Bureau of Labor Statistics. In contrast, less than two out of ten contained such agreements in 1944.

Currently, the greater portion of contracts (65 pct) establish a maximum of 2 weeks for paid vacations while another 32 pct grant more than two although a 3-week maximum is usually the practice for less than 15 years of service.

Baldwin's Net Off; Sales Rise

Philadelphia—The Baldwin Locomotive Works and its wholly owned subsidiaries earned \$2,297,098 for the first 9 months of this year, compared with \$2,443,797 for the corresponding period of last year. Sales for the first 9 months were \$92,852,937 this year, compared with \$89,676,732 in 1948.

REPORT FROM WALL STREET

By WALTER GUTMAN

The Stock Market And The Steel Strike

PEOPLE outside of Wall Street wonder why stocks have been going up when factories have been closing down. Several times during the month-old steel strike stock averages have made new highs for 1949. Many stocks have made new alltime highs. The short interest has gone up month by month and has been the highest in 17 years. Since amateurs seldom go short, it appears that quite a few Wall Street professionals are wondering too.

The bulls explain it this way: Stocks have been cheap for a long while during the postwar boom. But people have been scared of a post-war recession. Now they are becoming less afraid because the recession has not shown up on schedule. So they are taking a chance on buying stocks, often to get the rich dividends which are available.

At the same time that people with money nibble at stocks, people who own stocks cling tighter to them. Brokers report that insurance com-

Walter Gutman, Goodbody & Co., New York, is a professional market analyst. His comments were invited by THE IRON AGE as a result of numerous inquiries regarding the action of the stock market during the strike.—Ed.

panies, investment trusts, and other large-scale buyers are finding it hard to buy stocks. "Off the board" trading has expanded sharply as institutions swap stocks.

The stock market has ignored the strikes because people who own stocks want to keep them, and people with money are willing to bid up.

Both bulls and bears say that the public doesn't understand the market. The public forgets that stock prices are made by a relatively small section of the investment public. There are from 10 to 20 million stockholders in the U. S. And maybe

only 0.01 pct takes a daily interest in the market.

A fairly small change in public psychology can bring in enough stock to scare the professional group or enough money to encourage them. Recently alert professionals have simply been exploiting the fact that the strikes have not brought in stocks and that the short interest is heavy.

Inflation is also playing a part. Devaluation was expected to send stocks down but instead it started rumors about devaluation of the dollar. In Switzerland it started rumors about the Swiss Franc and hot international money concentrated there is said to have come into our market.

The main reason the public can't understand why the market doesn't follow the headlines is that many motives enter the stock market, whereas space limitations limit the motives available on the front pages.

Veteran investors got ready for the strike months ago when the news value was worth only page 3 to the editor. When the strike came, the market was "sold out" so far as that factor was concerned. As the strikes end, the market may sell off. Quite a few professionals expect it to. But that's a little too logical, so they probably will be wrong.

Another thing the public forgets is that the market is an evaluating mechanism. Stock prices capitalize earnings 3, 8, 10, 20 or more times. Major strikes seldom last more than a few months and therefore play a minor part in an equation which works in terms of years.

Business men who have to think in terms of months or go broke, forget that stocks cost nothing to keep. Some stocks sit in the same vault for a half century or more. The basic reason why the stock market is different from other markets is that there is no deadline. Few people ever are compelled to sell. And even fewer are compelled to buy.

Nation's Water and Power Projects Granted \$378 Million

Washington—With \$334 million in new funds available, the Bureau of Reclamation has given the green light for pushing work on its \$387 million water and power program on 63 projects involving 11 western and southwestern states.

This program includes \$96 million for the upper Missouri Basin projects which are considered as a single project.

The states, projects and tentative allotments for each are:

Arizona-Gila, \$6,281,000; Arizona-Nevada-Davis Dam, \$37,456,000; Arizona-Nevada, Boulder Canyon, \$6,621,800; Arizona-California, Parker Dam, \$650,000; California-Arizona, All-American Canal, \$5,961,300; California, Central Valley, \$64,500,000; California, Santa Barbara County, \$4,125,000; All-American Canal, \$5,961,000; California-Central Valley, \$64,500,000; Santa Barbara (Cachuma unit), \$4,125,000; Solana County, \$100,000; Kern River, \$8,700; King's River, \$32,000; Colorado-Colorado River, \$1,000,000; Paonia and Fire Mountain, \$628,000; San Luis Valley, \$1,864,000; Colorado-Big Thompson, \$24,860,000; and Grand Valley, \$1,700; Idaho-Anderson Ranch dam, \$3,620,000; Boise-\$2,285,000; Boise-Kuna, 7,400; Lewiston Orchards, \$691,000; Minidoka, \$465,000; Palisades, \$2,809,000; Preston Beach, \$103,000; and Rathdrum Prairie, \$3900; Montana-Buffalo Rapids, \$245,000; Sun River, \$43,000; Fort Peek, \$3,600,000; Hungry Horse, \$22,500,000; and Milk River, \$65,000; New Mexico-Fort Sumner, \$750,000; and Tucumcari, \$1,022,000; New Mexico-Texas, Rio Grande, \$372,000; Oklahoma, Austin project, \$409,000; Oregon-Deschutes, \$1,114,000; Oregon-California, Klamath, \$1,560,000; Oregon-Idaho, Owyhee, \$51,000; South Dakota, Belle Fourche, \$21,000; Utah-Ogden River, \$310,000; Utah River, \$5,239,000; and Weber Basin, \$334,000; Texas, Valley Gravity, \$83,000; Washington-Columbia Basin, \$79,000,000; and Yakima, \$1,071,000; Wyoming-Eden, \$200,000; Kendrick, \$1,892,000; Riverton, \$2,526,000; and Shoshone, \$916,000; and miscellaneous work, \$3,150,000.

A. O. Smith Sales and Net Rise

Milwaukee—A. O. Smith Corp. on Oct. 28 reported a net income for the fiscal year ending July 31 of \$7,026,341, equal to \$7.02 a share. This compared with an income of \$6,891,882, or \$6.89 per share, for the preceding fiscal year.

The company reported a record volume of sales for the last year which increased 9.2 pct to \$152,448,629 from \$139,477,780 the year ending July 31, 1948.

Survey of Mineable Coking Coals Shows Excellent Progress

Survey will serve as a guide in developing adequate reserves.

Washington—Entering its second year, a nationwide survey of mineable coking coals by the Bureau of Mines has made marked progress in four eastern states in the heart of the nation's most productive coal region.

The survey, which eventually will cover all of the nation's coking-coal-producing states, got underway in Indiana County, Pa., in August 1948. When completed, it will serve as a guide in developing adequate reserves for use in times of national emergency.

With five teams in the field, the bureau is now determining mineable reserves of coking coals in nine counties in central and western Pennsylvania, nine counties in West Virginia, nine counties in eastern Kentucky, and in a few counties across the border in Virginia. Work in these states will continue during 1950, eventually extending to all counties where coking coals are being mined.

Construction Activity Remains 1 Pct Ahead of '48

Washington—With a less than seasonal decline, October construction activity kept the year's totals slightly ahead (1 pct) of the first 10 months of 1948 in both physical and dollar volume.

New construction put in place during the month was estimated by the Commerce Dept. at more than \$1.8 billion to bring the 10-month total to \$15.9 billion.

Privately financed construction was off 6 pct from last year's value while publicly financed activity was up 26 pct although no construction under the recent low-cost housing act has yet been put in place.

Meantime, the proportion of privately financed construction activity has dropped. With private capital accounting for 78 pct of the total through October last

year, the proportion is now 72 pct.

Continuing a decline which started a year ago, industrial and business building activity for 1949 stands at \$1.7 billion as compared with \$2.2 billion last year.

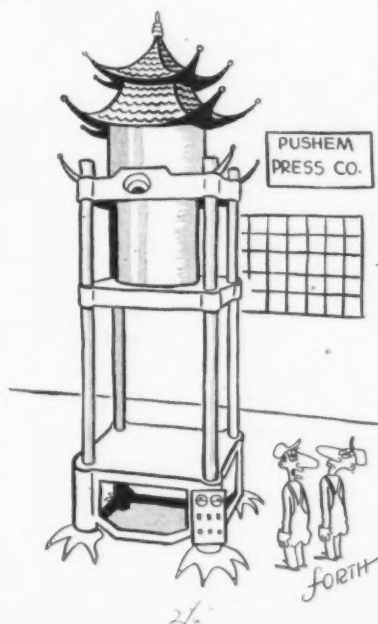
Industrial Advertising Is Climbing, NIAA Survey Shows

New York—Industrial advertising budgets are climbing back to the 1939 level of 2 pct of gross sales, compared to the 1948 rate of 1.9 pct.

This trend, based on reports from large and small companies in every major industrial area, is one of the significant features appearing in what has been termed the most comprehensive study in the 28-year history of the National Industrial Advertisers Assn.—the 1949 Survey of Industrial Advertising Budgets. It is a resumption of annual studies begun in 1931.

Thompson Products Profit Up

Cleveland—Thompson Products, Inc., reported nine months' net profit of \$4,397,942 on sales of \$79,508,615. Net profit represented 5½ pct of net sales. At the three-quarter mark last year net profit was \$3,621,345 on sales of \$72,560,467. Earnings were 5 pct of net sales.



"It's for export but they won't say where."

Stainless Steel Conveyor Belt Tests Prove Successful

Springfield, Ill.—A. B. Crichton, Jr., assistant to president of Johnstown Coal & Coke Co., told the convention audience of the Mining Institute, that experiments with stainless steel conveyor belts have proved to be successful. The advantages of the steel belt compared to the conventional rubber belts of the past, Mr. Crichton said, are: Sections can be connected easily by riveting, welding, or lacing, the exact lengths and attachments for making belt extensions underground are quick and simple, stainless steel is not affected by acid mine waters or lubricating oils, and because of the rigidity of the steel belt it is possible to space carrier idlers at much greater distances than heretofore.

About 700 mine operators, officials and equipment makers attended the convention. I. G. Gerow, executive vice-president of Traux-Traer Co., Chicago, was elected president of the institute for the coming year. He succeeds J. Roy Browning, vice-president and commissioner of the Illinois Coal Operators Assn.

Aid Costs Reach \$7.1 Billion

Washington—Authorization of an additional \$71 million in procurements brought the cumulative total of Marshall Plan aid to Europe to \$7.1 billion as of Oct. 30.

Included in recent authorizations were \$3 million in industrial machinery and \$2.5 million for construction and mining equipment for Belgium and Luxembourg; \$1.4 million in industrial machinery for Denmark; \$1.4 million for machine tools and \$2.7 million in aircraft parts for France; \$1.6 million in industrial machines for Norway; \$1.2 million in agricultural equipment for Britain; and \$1.4 million in steel mill products for Ireland.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"The Real Culprit"

It was a cocktail party in an up-town apartment. The men were clustered in a group in the middle of the room. "No one wants to be stuck with dollars." It was an investment banker from "the street" holding forth. The stock market had just moved up another notch. "Smart people are buying," continued the banker. "They are going into equities."

These thoughts are typical of prevailing opinion. They rest in large part on the assumption that the government will shortly devalue the dollar. Even if it does not take such action in the form of a rise in the price of gold, it is committed to deficit financing. When the government debt is increased by \$4 billion, as it has been during the current year, it means an addition of that amount to the inflation potential. For every dollar of that debt can be monetized, i.e., converted into bank credit against which checks may be drawn or into paper money which may be spent directly.

In fact, when the stock market looks at the possible devaluation of the dollar in terms of gold it is looking at the wrong gage. Such a devaluation is largely a bookkeeping transaction without any immediate direct effect on prices, except insofar as it may affect public psychology. This is due to the fact that the country is not on a gold standard. The alleged connection between money and gold is entirely phony.

A rise in the price of gold would stimulate gold production. It would tend once more to reverse the flow of yellow metal into this country from other parts of the world. It would permit a markup in the value of the Treasury gold hoard which could be used by adroit political

propaganda as an offset to the increase in the public debt. It would cancel some of the trade advantage which may be accruing for the benefit of sterling area countries as a result of British devaluation. There the tangible effects stop.

Of far greater importance in asaying the course of inflation is the actual supply of money and credit available to Americans for spending. Every time Uncle Sam sells a billion of his IOUs, which are not bought out of savings, he has added that much to the money supply.

The allegation that private hoarding of gold is "contrary to public policy" is a lead from official fear. It is a fear that such hoarding may halt the game of public deception which the money managers are playing arduously for the benefit of the boys in power.

As long as the gold is held by the government, any increase in price will confine the windfall appreciation entirely to the U. S. Treasury. It will be exploited as "an increase in the backing" for our floods of "insanitary paper money." An artificial price for gold, with huge amounts of the yellow metal in a show case, may give the appearance of real substance. It may postpone the day when the average citizen no longer has any confidence in the currency. This is the real clue to Treasury policy on the private ownership of gold. The denial of such ownership cloaks the debasement of the currency and postpones the ultimate denouement.

The Wall St. banker holding forth at the cocktail party may be wrong in the choice of authentic symptoms. The prospect of deliberate depreciation is no less real because it is achieved primarily through deficit financing instead of a markup in the price of gold.

Construction Steel Awards

Fabricated steel awards this week included the following:

- 2830 Tons, Chicago, Veterans Hospital, previously reported J. L. Simmons Co., Chicago. Mississippi Valley Structural Steel Co., Chicago, has now been awarded the steel contract.
- 1300 Tons, Marshalltown, Iowa, Center St. overhead bridge through Jensen Construction Co., Des Moines, to Illinois Steel Bridge Co., Chicago.
- 560 Tons, Queens, N. Y., 2-6 story apartment houses to Grand Iron Works, New York.
- 300 Tons, Chicago, Peoria St. bridge, through Kenny Construction Co., Chicago, to American Bridge Co., Pittsburgh.
- 225 Tons, Chicago, Eden Parkway bridge Section 263-0808-1-15D to American Bridge Co., Pittsburgh.
- 140 Tons, Cook County, Ill., bridge Section 263-1212-1-15D through States Improvement Co., Chicago, to American Bridge Co., Pittsburgh.

Fabricated steel inquiries this week included the following:

- 380 Tons, Santa Clara County, Calif., grade separation near Gilroy, California Div. of Highways, Sacramento, bids to Nov. 30.

Reinforcing bar awards this week included the following:

- 700 Tons, Chicago, Veterans General Hospital, J. L. Simmons Co., Chicago, low bidder.
- 295 Tons, Chicago, housing location No. 1 to J. T. Ryerson and Son, Chicago.
- 250 Tons, Clinton, Iowa, building for Certainated Products Co., to Pittsburgh Des Moines Steel Co., Des Moines, Iowa.
- 250 Tons, Chicago, building for U. S. Brewing Co., previously reported to M. J. Boyle Co. Steel has been awarded to Ceco Steel Products Co., Chicago.
- 250 Tons, Lafayette, Ind., dormitory and agricultural building for Purdue University, to Ceco Steel Products Co., Chicago.
- 225 Tons, Riverdale Junction, N. D., Garrison Dam project through U. S. Engineers, U. S. Steel Supply Co., Chicago, low bidder.
- 195 Tons, Elgin, Ill., Sherman Hospital through Peter Hamlin Construction Co. to Dean Steel Co., Chicago.
- 170 Tons, Milwaukee, Martenique apartment building to U. S. Steel Supply Co., Chicago.
- 150 Tons, Sheridan, Ill., Illinois State Reformatory building, Mayfair Construction Co., Chicago, low bidder.
- 113 Tons, LaGrange, Ill., physical education building through Coat H. and Cass, Chicago, to Ceco Steel Products Co., Chicago.
- 100 Tons, Decatur, Ill., building for Staley Mfg. Co. to U. S. Steel Supply Co., Chicago.
- 100 Tons, Ft. Wayne, Kresge store building to J. T. Ryerson and Son, Chicago.

Reinforcing bar inquiries this week included the following:

- 2250 Tons, Riverdale Junction, N. D., through U. S. Engineers, Garrison Dam project.
- 1030 Tons, Chicago, Parkway garden homes.
- 350 Tons, Attleboro, Mass., bituminous macadam asphalt roadway, F. A. Chase, Taunton, engineer. Completion date Nov. 25, 1950.
- 350 Tons, Mt. Savage, Md., Mt. Savage school building.
- 280 Tons, Imperial and Riverside Counties, Calif., bridges between Niland and Durmid, California Div. of Highways, Los Angeles, bids to Dec. 1.
- 190 Tons, Cleveland, bridge for the Wheeling and Lake Erie R.R.
- 190 Tons, Croix County, Wis., state highway bridge.
- 175 Tons, Santa Clara County, Calif., grade separation near Gilroy, California Div. of Highways, Sacramento, bids to Nov. 30.
- 120 Tons, Galesburg, Ill., building for Knox College, bids closed Nov. 8.
- 120 Tons, Boston, Charles River Reservation, new marginal conduit and appurtenances, to West Construction Co., and Julian Construction Co., West Roxbury, Mass.

Briefs and Bulletins

no ore shortage—Despite the disruption of ore shipping because of the strike, it is believed that there is enough ore on hand at furnaces and Lake Erie docks to support near capacity steel operations through the closed shipping season. According to Lake Superior Iron Ore Assn. figures, stocks on hand at furnaces and Lake Erie docks Oct. 1, when the strike began, were estimated at 45,356,369 gross tons. In the past 6 weeks Canadian ore carriers have brought down an estimated 700,000 tons, making an estimated total of 46 million gross tons on hand. On Dec. 1, 1948, stocks totaled 45,160,225 gross tons. Assuming consumption at the rate of 3.5 million tons in November and 7 million gross tons a month through March, the industry would have on hand Apr. 1 about 14.5 million gross tons, or a little more than in 1947 when iron ore stocks dropped to 13.5 million tons at the opening of Great Lakes navigation.

conversion deals—Off-the-cuff conclusions that conversion steel will bridge the gap between the resumption of steel production and capacity operation are optimistic. Few ingots are immediately available and ingot molds may be a bottleneck. A third obstacle is mill unwillingness to guarantee alloy residuals picked up in scrap, and without this assurance auto companies don't want to risk buying it. A fair estimate for shipping time on conversion steel is 6 to 8 weeks, unless ingot molds must be bought too.

strike bill—The E. J. and E. Railroad is holding on demurrage 4800 loaded cars for South Works and Gary plants of Carnegie and the Indiana Harbor plant of Youngstown Sheet and Tube. About 1000 of these cars are loaded with scrap. Strike demurrage amounts to \$1.80 per car per day, so these three mills have a debit of \$328,120 so far in demurrage charges alone.

acquisition—Standard Steel Spring Co., Coraopolis, Pa., will acquire all assets of Falls Spring & Wire Co. which has plants in Detroit, Chicago, Kansas City and Chelsea, Mich. Falls officials Harry Fante, chairman; Larry Swanson, president, and John P. O'Hara, a director, will become directors of Standard Steel Spring, increasing the board from 12 to 15 members.

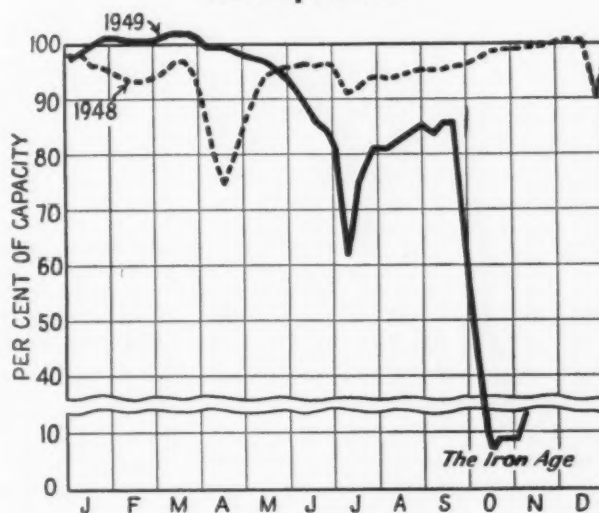
railroads merge—Three subsidiary railroads of U. S. Steel Corp. merged last week to form one corporate organization. The Bessemer & Lake Erie R.R. took over the Pittsburgh, Bessemer & Lake Erie R.R. Co. and the Meadville, Conneaut Lake & Linesville, R. R. Co.

short answer—When Pittsburgh's Mayor David L. Lawrence appealed to John L. Lewis for permission to reopen some mines to overcome coal shortages in Pittsburgh, the United Mine Workers president replied, "Why don't you go down to the Duquesne Club to get some coal?"

to the rescue—To help alleviate a coal famine in Pittsburgh due to the mine strike, Carnegie-Illinois Steel Corp. Monday agreed to release more than 90,000 tons from its stockpile for distribution to hospitals and other institutions and to the Allegheny Steam Heating Co., which supplies heat for downtown buildings. President Charles R. Cox of Carnegie-Illinois released the coal in response to a plea from Mayor David L. Lawrence. A special committee will administer distribution. Reserves of some hospitals and the heating company had reached the critical stage.

pipe plant—The Lone Star Steel Co., Lone Star, Tex., reported that it will build a cast iron pressure pipe plant costing about \$1 million. The new plant is scheduled to be completed in 6 to 8 months. The company also reported that its blast furnace which was banked in August will be put back into production in a week or 10 days.

Steel Operations



District Operating Rates—Per Cent of Capacity

Nov. 6 22 pct

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
October 30	2.0	5.0		28.0*		25.0*	65.0		38.0*	24.5	37.0	91.5	35.0	12.5*
November 6	10.0	5.0		52.0		32.5	5.0		35.0	34.0	37.0	91.5	35.0	22.0**

* Revised.
** Estimated.

Nonferrous METALS OUTLOOK

Market Activities

Copper up $\frac{7}{8}\epsilon$ and zinc another $\frac{1}{4}\epsilon$. . . Demand for brass mill products remains active . . . Lead supplies adequate . . . Resale tin offered at 94¢.



by

John Anthony

New York — The underlying strength of the metal markets in the face of the threat to operations of metal fabricating plants of the continuing steel and coal strikes was seen last week when the price of copper was increased by $\frac{7}{8}\epsilon$ and of zinc by another $\frac{1}{4}\epsilon$.

These developments, reflecting the strong market, were followed by increases in the prices of brass and bronze ingots, copper and brass scrap, brass and wire mill products, and aluminum secondary ingots and scrap.

Buying Mill Products

The demand for brass mill products has been very active in spite of the strikes. There are a few consumers who have deferred shipment, preferring to wait and see what developments there may be after the strikes are over. In announcing the new mill products prices, all mills have continued in effect the policy of price at time of shipment. The mills are not anxious to absorb the cost of further increases in metal prices, so long as business is coming in.

Copper demand is very active at

the new prices. There is a feeling in the market that the price may be stabilized at the 18.50¢ level.

See Zinc Price Rise

Zinc is in a somewhat different position, considering the strength in the market when galvanizing demand is absent. Strikes are continuing at Palmerton, Pa. and Kellogg, Idaho. The effect of these strikes has been to reduce production to the extent that the effect of the steel strike is neutralized. But with the approaching end of the steel strike, there is every possibility of a further increase in the price of zinc.

The demand for lead has improved some, but there is plenty of lead around. With the end of the steel strike, demand for lead should

improve. Replacement battery business is not good, however, as the battery makers have sufficient stock on hand to take care of a normal winter. If it becomes apparent that there will be some real cold weather this year, the demand from the industry will pick up.

Tin Sales at 94¢

The tin market has not improved appreciably. Resale tin is still being offered to the market and has been moving in small lots at 94¢. The London Metal Exchange is still scheduled to open on Nov. 15 for operations in tin.

The International Tin Study Group at The Hague is now working on a proposed agreement to be submitted to member governments to establish a tin production control scheme.

NONFERROUS METALS PRICES

	Nov. 2	Nov. 3	Nov. 4	Nov. 5	Nov. 7	Nov. 8
Copper, electro, Conn.	17.625	18.50	18.50	18.50	18.50	18.50
Copper, Lake, Conn.	17.75	18.625	18.625	18.625	18.625	18.625
Tin, Grade A, New York ...	94.00	94.00	94.00	94.00	94.00	94.00
Zinc, East St. Louis	9.75	9.75	9.75	9.75	9.75	9.75
Lead, St. Louis	12.80	12.80	12.80	12.80	12.80	12.80

Note: Quotations are going prices.

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 25.9¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.9¢; 76S-O, 76S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 26.9¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 76S-O, 76S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 76S-O, 76S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 76S-F, 76S-FAL, 38.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to 105¢; 35 to 37, 44¢ to 11.53; 47 to 49, 63.5¢ to 12.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 35.5¢ to 32¢.

Screw Machine Stock: Drawn, ¼ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ¼ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ¾ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2½ to 3½ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 66S, 47¢ to 35.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 76S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheets and Plate: Ma, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01; 22, 1.12-1.31; 24, 1.62-1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2¼ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2¼ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, 51.14; 5/16 to ¾, 51.02; ¾ to 1, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to 1, 62¢; 1 to 2 in., 67¢; 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 63¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	40	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	32.18	28.03	31.78
Copper, h-r		28.03	
Copper, drawn		29.28	
Low brass	30.12	29.81	33.03*
Yellow brass	28.69	28.38	31.70*
Red brass	30.60	30.29	33.51*
Naval brass	33.51	27.57	28.82
Leaded brass		23.19	27.22
Com'l bronze	31.61	31.30	34.27*
Manganese bronze			
Phosphor bronze	37.01	30.92	32.42
Muntz metal	31.58	27.14	28.39
Everdur, Her-culoy, Olym-pie, etc.	37.19	36.14	
Nickel silver, 10 pct	39.66	41.87	46.80
Arch. bronze			27.22

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$52.00
Bismuth, ton lots	\$2.00
Cadmium, delf'd	\$2.00
Cobalt, 97-99% (per lb)	\$1.80 to \$1.87
Copper, electro, Conn. Valley	18.50
Copper, lake, Conn. Valley	18.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$100 to \$110
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	\$72 to \$75
Nickel, electro, f.o.b. New York	42.97
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$69 to \$72
Silver, New York, cents per oz.	73.25
Tin, New York	94.00
Zinc, East St. Louis	9.75
Zinc, New York	10.47
Zirconium copper, 10-12 pct Zr, per lb contained Zr	\$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	16.75	18.25
No. 120	15.25	17.75
No. 123	16.75	17.25
80-10-10 ingot		
No. 305	22.75	
No. 315	19.75	
88-10-2 ingot		
No. 210	29.25	
No. 215	26.25	
No. 245	19.25	21.50
Yellow ingot		
No. 405	14.25	16.00
Manganese bronze		
No. 421	20.75	

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys		
0.30 copper, max.	18.75-19.25	
0.60 copper, max.	18.25-18.75	
Piston alloys (No. 122 type)	16.50-17.00	
No. 12 alum. (No. 2 grade)	15.75-16.50	
108 alloy	16.3¢-17.3¢	
195 alloy	17.50-18.00	
13 alloy	18.50-18.75	
AXS-679	16.3¢-17.3¢	
5% Ti. Aluminum, f.o.b., Eddystone, Pa.	31.00	
Low copper		28.00
2% copper		

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.75-18.50
Grade 2—92-95%	16.75-17.50
Grade 3—90-92%	15.75-16.50
Grade 4—85-90%	14.75-15.50

Electroplating Supplies

(Cents per lb, freight allowed, in 500 lb lots)

Copper		
Cast, oval, 15 in. or longer	34%	
Electrodeposited	28%	
Roller, oval, straight, delivered	33.34	
Ball anodes	32%	
Brass, 80-20		
Cast, oval, 15 in. or longer	30%	
Zinc, oval, 99.886, f.o.b. Detroit	17%	
Ball anodes	16%	
Nickel 99 pct plus		
Cast	59.00	
Roller, depolarized	60.00	
Cadmium	\$2.15	
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	45.00
Copper sulfate, 99.5 crystals, bbl.	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ¼¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turn-ings
Copper	15½	14¾
Yellow brass	12½	11¾
Red brass	14	13¼
Commercial bronze	14½	13½
Manganese bronze	12	11¾
Leaded brass rod ends	12½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	15.25
No. 2 copper wire	14.25
Light copper	13.25
Refinery brass	13.25*
Radiators	10.25

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	15.25
No. 2 copper wire	14.25
Light copper	13.25
No. 1 composition	13.00
No. 1 comp. turnings	12.50
Roller brass	10.50
Brass pipe	11.50
Radiators	10.50
Heavy yellow brass	10.00

Aluminum

Mixed old cast	10.50-11.00
Mixed old clips	10.50-11.00
Mixed turnings, dry	8.50-9.00
Pots and pans	10.50-11.00
Low copper	11.50-12.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	13½-13¾
No. 2 heavy copper and wire	12½-12¾
Light copper	11½-11¾
Auto radiators (unsweated)	8¾-9
No. 1 composition	11-11½
No. 1 composition turnings	10½-10¾
Clean red car boxes	9¼-9½
Cocks and faucets	9¼-9½
Mixed heavy yellow brass	7¼-7½
Old rolled brass	8½-8¾
Brass pipe	9¼-10
New soft brass clippings	10½-11
Brass rod ends	9¼-10
No. 1 brass rod turnings	9½-9¾

Aluminum

Alum. pistons and struts	5-5½
Aluminum crankcases	7½-8½
2S aluminum clippings	10½-11
Old sheet and utensils	7½-8½
Borings and turnings	4
Misc. cast aluminum	7½-8½
Dural clips (24S)	7½-8½

Zinc

New zinc clippings	6-6½
Old zinc	4½-5
Zinc routings	2½-3
Old die cast scrap	3½-3¾

Nickel and Monel

Pure nickel clippings	21-23
Clean nickel turnings	14-15
Nickel anodes	20-22
Nickel rod ends	20-22
New Monel clippings	12-14
Clean Monel turnings	8-9
Old sheet Monel	10-12
Old Monel castings	9-10
Inconel clippings	11-13
Nickel silver clippings, mixed	8-10
Nickel silver turnings, mixed	6-7

Lead

Soft scrap, lead	9½-10
Battery plates (dry)	5½-5¾

Magnesium

Segregated solids	9-10
Castings	5½-6½

Miscellaneous

Block tin	70-72
No. 1 pewter	43-45
No. 1 auto babbitt	38-40
Mixed common babbitt	10-10½
Solder joints	11½-12
Siphon tops	44-46
Small foundry type	12½-13
Monotype	11½-12
Lino. and stereotype	10½-11¼
Electrotype	9¼-9½
New type shell cuttings	11½-11¾
Hand picked type shells	5-5½
Lino. and stereo. dross	4½-5
Electro. dross	2¾-3

MARKETS—PRICES—TRENDS



SCRAP

Iron & Steel

Prices Advance As Mills Resume Buying

Substantial price advances were in evidence this week as more steel concerns were getting back into production. Buying by both struck and unstruck mills raised the price of No. 1 steel \$4.00 a ton in some areas. There is ample evidence that the Pittsburgh mills need scrap with shipments being received from a number of localities on the eastern seaboard. Material is still being held by some dealers in anticipation of higher prices. The foundry grades are still firm with few price changes. The top quotation of No. 1 steel was up \$4.00 in Cleveland and Youngstown; in New York it was up \$3.00; in Pittsburgh, Philadelphia, Detroit, Cincinnati and Boston it was up \$2.00; and in Buffalo it was up 50¢. THE IRON AGE scrap composite is up \$1.34 to \$28.92 per gross ton.

PITTSBURGH—No. 1 heavy melting jumped \$2.00 to a top of \$32.00 this week on the basis of a sale. The market continued strong on the strength of reports that several independent steel producers were nearing a settlement with the union that would permit reopening of struck plants. Low phos was up \$1.00 and No. 1 railroad jumped \$4.00 to a top of \$34.00.

CHICAGO—Buying by brokers continued with some offers of prices well over that which the mills have yet paid. A runaway scrap market is not in the cards as mills hold sufficient inventories and have placed enough tonnage for after strike delivery to prevent it. However, all indications point to a continued strong market. Railroad scrap prices advanced sharply with regular openhearth items still lagging behind this part of the market. Good activity in cast iron scrap continued and possible pig iron shortages later in the year are effecting these items.

PHILADELPHIA—A district mill bought No. 1 last week, raising prices of steel grades by \$1.00 to \$2.00. Low phos, rail specialties and breakable cast are quoted \$1.00 higher. Bundles were shipped out to the Pittsburgh district. Turnings are quoted higher on an appraisal basis. The cast market is strong, with pipe mills back in the market again. With the settlements now completed or under way in this district, all factors see a strong market. Unloading of scrap began early this week in Coatesville.

NEW YORK—Scrap prices are higher here on increased consumer demand. No. 1 steel is up \$3.00 to \$21.50—\$22.00, and sources indicate that it is difficult to obtain sufficient material at this price. Some consumers are asking for material before the settlement of their strike with the steelworker's union. Cast prices are firm and there has been no great demand for any of these items.

DETROIT—Failure to end the steel strike has prolonged the hour of decision facing the Detroit scrap market. The undertone of the market is very strong. Dealers continue to hold on to their stockpiles but in the absence of a broad steel settlement the pressure by brokers has subsided momentarily, it is reported. The continuing pressure on dealers, however, and reports of mill buying in small tonnages has resulted in a further increase in Detroit quotations this week.

CLEVELAND—A strong and speculative market prevailed here and in the Valley following a sale of a representative of No. 1 heavy melting steel to a Valley consumer at \$33.00. An estimated 50,000 tons of scrap, primarily in the hands of big brokers awaits formal opening of the market. This tonnage will probably be applied against the first orders and will act, it is rumored, as a cushion temporarily against a runaway market. After the initial phase, a higher market is expected to develop. Many dealers are holding out for the last buck and beyond, and it seems likely that some dealer tonnage will be carried over to 1950 for tax purposes unless the price is right.

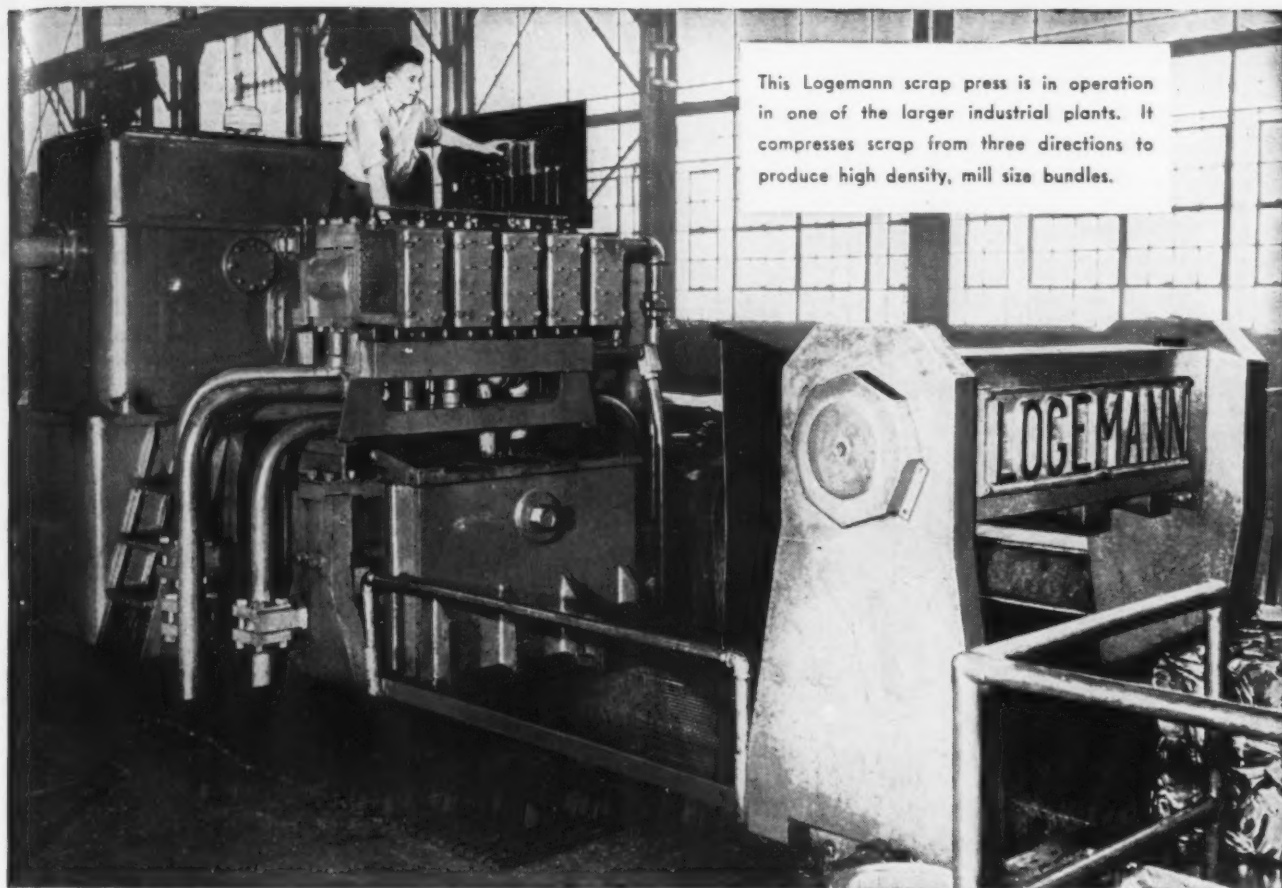
BOSTON—Prices on the steel grades are up substantially this week on material that is being delivered to out-of-the-district consumers. No. 1 steel is up \$2.00 to \$19.50—\$20.00, which is a new high for the current move. Cast is dull with no change in price.

CINCINNATI—Tempo of the scrap market here reflected settlement by a district consumer with the CIO. Prices advanced, based on sales of representative tonnages, and with more favorable strike news generally, threat of movement of tonnage to the Pittsburgh district will become a market factor. Many district dealers are continuing to hold their tonnage in anticipation of a high market, while foundry grades were showing signs of both strength and weakness.

ST. LOUIS—There was no new buying by users of scrap iron in the St. Louis industrial district during the week. The movement of material against current orders is reported as heavy. The market continues strong with the feeling that an early settlement of the steel strike is due.

BIRMINGHAM—The price undertone is strong in this market but trading is light. No openhearth material is moving and dealers are reluctant to sell cast iron and electric furnace grades at current prices.

BUFFALO—Recent declines of 50¢ to \$1.00 a ton in steelmaking grades of scrap were erased following the break in the steel strike. The easement in prices which developed during the strike faded. Fresh buying interest was reported but no new sales of any consequence were reported as dealers were shipping against large orders placed immediately preceding the steel walkout. The cast market continues to favor the soft side with tonnage still moving within prevailing ranges.



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-Contained } **LOGEMANN**
 Triple Compression . . } **SCRAP PRESSES**
 Automatically Controlled }

handle high tonnages with minimum labor . . . at low cost

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Pittsburgh

No. 1 hvy. melting	\$31.50 to \$32.00
No. 2 hvy. melting	29.50 to 30.00
No. 1 bundles	31.50 to 32.00
No. 2 bundles	24.50 to 25.00
Machine shop turn.	21.00 to 21.50
Mixed bor. and ms. turn.	21.00 to 21.50
Shoveling turnings	23.50 to 24.00
Cast iron borings	22.50 to 23.00
Low phos. plate	33.00 to 33.50
Heavy turnings	24.00 to 25.00
No. 1 RR. hvy. melting	33.50 to 34.00
Scrap rails, random lgth.	35.00 to 36.00
Rails 2 ft and under	39.00 to 40.00
RR. steel wheels	33.00 to 34.00
RR. spring steel	33.00 to 34.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Malleable	32.00 to 33.00

Chicago

No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 factory bundles	30.00 to 31.00
No. 1 dealers' bundles	28.00 to 29.00
No. 2 dealers' bundles	25.00 to 26.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	36.00 to 37.00
Low phos. plate	33.00 to 34.00
No. 1 RR. hvy. melting	33.50 to 34.50
Scrap rails, random lgth.	39.00 to 40.00
Rerolling rails	46.00 to 47.00
Rails 2 ft and under	44.00 to 45.00
Locomotive tires, cut	41.00 to 42.00
Cut bolsters & side frames	33.00 to 35.00
Angles and splice bars	38.00 to 39.00
RR. steel car axles	47.00 to 48.00
No. 3 steel wheels	35.00 to 36.00
RR. couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	43.00 to 45.00
No. 1 agricul. cast.	42.00 to 43.00
Heavy breakable cast.	38.00 to 39.00
RR. grate bars	33.00 to 34.00
Cast iron brake shoes	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Malleable	37.00 to 38.00

Philadelphia

No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	22.50 to 23.50
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.50 to 17.50
Low phos. punchings, plate	26.50 to 27.50
Low phos. 5 ft and under	25.50 to 26.00
Low phos. bundles	25.50 to 26.00
Hvy. axle forge turn.	24.00 to 25.00
Clean cast chem. borings	26.00 to 27.00
RR. steel wheels	29.00 to 29.50
RR. spring steel	29.00 to 29.50
Rails 18 in. and under	36.00 to 37.00
No. 1 machinery cast	36.00 to 38.00
Mixed yard cast	34.00 to 35.00
Heavy breakable cast	33.00 to 34.00
Cast iron carwheels	34.00 to 35.00
Malleable	34.00 to 35.00

Cleveland

No. 1 hvy. melting	\$28.50 to \$29.00
No. 2 hvy. melting	26.50 to 27.00
No. 1 busheling	28.50 to 29.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	18.50 to 19.00
Machine shop turn.	14.00 to 14.50
Mixed bor. and turn.	15.50 to 16.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	19.50 to 20.00
Low phos. 2 ft and under	29.50 to 30.00
Steel axle turn.	28.50 to 29.00
Drop forge flashings	28.50 to 29.00
No. 1 RR. hvy. melting	32.00 to 33.00
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	44.00 to 45.00
No. 1 machinery cast.	44.00 to 45.00
RR. cast.	44.00 to 45.00
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	\$32.50 to \$33.00
No. 2 hvy. melting	30.50 to 31.00
No. 1 bundles	32.50 to 33.00

Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

No. 2 bundles	\$22.50 to \$23.00
Machine shop turn.	22.50 to 23.00
Shoveling turnings	24.50 to 25.00
Cast iron borings	23.50 to 24.00
Low phos. plate	33.50 to 34.00

Buffalo

No. 1 hvy. melting	\$27.50 to \$28.00
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	25.50 to 26.00
No. 1 bundles	26.50 to 27.50
No. 2 bundles	24.50 to 25.00
Machine shop turn.	19.00 to 19.50
Mixed bor. and turn.	20.00 to 20.50
Shoveling turnings	21.50 to 22.00
Cast iron borings	20.00 to 20.50
Low phos. plate	29.50 to 30.00
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	37.50 to 38.00
RR. steel wheels	33.50 to 34.00
RR. spring steel	33.50 to 34.00
RR. couplers and knuckles	33.50 to 34.00
No. 1 cupola cast	37.00 to 37.50
Mixed yard cast	35.50 to 36.00
Stove plate	35.00 to 35.50
Small indus. malleable	24.00 to 24.50

Birmingham

No. 1 hvy. melting	\$25.00
No. 2 hvy. melting	24.00
No. 2 bundles	22.00
No. 1 busheling	24.00
Machine shop turn.	\$16.00 to 17.00
Shoveling turnings	19.00
Cast iron borings	18.00
Bar crops and plate	29.00 to 30.00
Structural and plate	29.00 to 30.00
No. 1 RR. hvy. melt.	28.00 to 28.50
Scrap rails, random lgth.	29.00 to 30.00
Rerolling rails	36.00 to 37.00
Rails 2 ft and under	34.00 to 35.00
Angles & splice bars	32.00 to 33.00
Std. steel axles	28.00 to 29.00
No. 1 cupola cast	34.00 to 35.00
Stove plate	28.00
Cast iron carwheels	23.00 to 24.00

St. Louis

No. 1 hvy. melting	\$29.00 to \$30.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 bundled sheets	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Rails, random lengths	35.00 to 36.00
Rails 3 ft and under	38.00 to 40.00
Locomotive tires, uncut	29.00 to 30.00
Angles and splice bars	37.00 to 38.00
Std. steel car axles	40.00 to 42.00
RR. spring steel	33.00 to 35.00
No. 1 machinery cast	37.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	31.00 to 32.00
Stove plate	33.00 to 35.00
Cast iron car wheels	34.00 to 35.00
Malleable	30.00 to 32.00

New York

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$21.50 to \$22.00
No. 2 hvy. melting	18.50 to 19.00
No. 2 bundles	16.00 to 17.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	12.50 to 13.50
Clean cast chem. bor.	22.00 to 23.00
No. 1 machinery cast.	31.00 to 32.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	27.00 to 28.00
Heavy breakable cast.	27.00 to 28.00
Unstrp. motor blocks	25.00 to 26.00

Boston

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$19.50 to \$20.00
No. 2 hvy. melting	17.50 to 18.00
No. 1 bundles	19.50 to 20.00

No. 2 bundles	\$16.00 to \$16.50
Machine shop turn.	11.00 to 11.50
Mixed bor. and turn.	10.50 to 11.00
Shoveling turnings	12.50 to 13.00
No. 2 busheling	13.00 to 13.50
Clean cast chem. borings	17.50 to 18.50
No. 1 machinery cast.	32.00 to 34.00
No. 2 machinery cast.	28.00 to 29.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$23.00 to \$24.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 bundles	25.00 to 26.00
New busheling	25.00 to 26.00
Flashings	23.00 to 24.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. plate	25.00 to 26.00
No. 1 cupola cast	35.00 to 36.00
Heavy breakable cast	29.00 to 30.00
Stove plate	28.00 to 29.00
Automotive cast	35.00 to 36.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$29.50 to \$30.00
No. 2 hvy. melting	25.50 to 26.00
No. 1 bundles	29.50 to 30.00
No. 2 bundles	23.50 to 24.00
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	16.50 to 17.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	17.50 to 18.00
Low phos. 18 in. under	35.00 to 36.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	43.00 to 44.00
No. 1 cupola cast	40.00 to 41.00
Hvy. breakable cast	36.00 to 37.00
Drop broken cast	43.00 to 44.00

San Francisco

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn	9.00
Elec. fur 1 ft and under	28.00
No. 1 RR. hvy. melting	17.00
Scrap rails, random lgth.	17.00
No. 1 cupola cast.	\$30.00 to 35.00

Los Angeles

No. 1 hvy. melting	\$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	\$36.00 to 40.00

Seattle

No. 1 hvy. melting	\$16.00
No. 2 hvy. melting	16.00
No. 1 bundles	15.00
No. 2 bundles	15.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	27.50
RR. hvy. melting	19.00
No. 1 cupola cast.	\$27.00 to 30.00
Heavy breakable cast.	20.00

Hamilton, Ont.

Cast grades f.o.b. shipping point:

No. 1 hvy. melting	\$24.00
No. 1 bundles	24.00
No. 2 bundles	23.50
Mechanical bundles	22.00
Mixed steel scrap	20.00
Mixed bor. and turn.	18.00
Rails, remelting	24.00
Rails, rerolling	27.00
Bushelings	18.50
Bush., new fact. prep'd.	22.00
Bush., new fact. unprep'd	17.00
Short steel turnings	18.00
Cast scrap	\$40.00 to 43.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various local quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
(cents per pound)				
Hot-rolled sheets	3.25	3.25	3.25	3.26
Cold-rolled sheets	4.00	4.00	4.00	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.038	4.038	4.038	4.063
Plates	3.40	3.40	3.40	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate:				
(dollars per base box)				
Tinplate (1.50 lb) cokes	\$7.75	\$7.75	\$7.75	\$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes:				
(cents per pound)				
Merchant bars	3.35	3.35	3.35	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.75	3.75	3.75	3.75
Structural shapes	3.25	3.25	3.25	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire:				
(cents per pound)				
Bright wire	4.15	4.15	4.15	4.256
Rails:				
(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$3.20
Light rails	3.55	3.55	3.55	3.55
Semifinished Steel:				
(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$52.00
Slabs, rerolling	52.00	52.00	52.00	52.00
Forging billets	61.00	61.00	61.00	61.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	63.00
Wire rod and Skelp:				
(cents per pound)				
Wire rods	3.40	3.40	3.40	3.619
Skelp	3.25	3.25	3.25	3.25

Composite Prices

Finished Steel Base Price	Nov. 8, 1949	One week ago	One month ago	One year ago
per lb.	3.705¢	3.705¢	3.705¢	3.720¢

High	Low	High	Low
1949.... 3.720¢ Jan. 1	3.705¢ May 3	1948.... 3.721¢ July 27	3.193¢ Jan. 1
1947.... 3.193¢ July 29	2.848¢ Jan. 1	1946.... 2.848¢ Dec. 31	2.464¢ Jan. 1
1945.... 2.464¢ May 29	2.396¢ Jan. 1	1944.... 2.396¢	2.396¢
1943.... 2.396¢	2.396¢	1942.... 2.396¢	2.396¢
1941.... 2.396¢	2.396¢	1940.... 2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939.... 2.35367¢ Jan. 3	2.26689¢ May 16	1938.... 2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937.... 2.58414¢ Mar. 9	2.32263¢ Jan. 4	1936.... 2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935.... 2.07642¢ Oct. 1	2.06492¢ Jan. 8	1934.... 2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933.... 1.95578¢ Oct. 3	1.75836¢ May 2	1932.... 1.89196¢ July 5	1.83901¢ Mar. 1
1931.... 1.99626¢ Jan. 13	1.86586¢ Dec. 29	1929.... 2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron:	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
(per gross ton)				
No. 2, foundry, Phila....	\$50.42	\$50.42	\$50.42	\$51.56
No. 2, Valley furnace...	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti...	46.08	46.08	46.08	49.47
No. 2, Birmingham.....	39.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia..	49.92	49.92	49.92	50.76
Basic, Valley furnace....	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese†	173.40	173.40	173.40	161.71

†The switching charge for delivery to foundries in the Chicago district is \$1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap:	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
(per gross ton)				
Heavy melt'g steel, P'gh.	\$31.75	\$29.75	\$29.75	\$42.75
Heavy melt'g steel, Phila.	24.50	22.50	24.50	44.50
Heavy melt'g steel, Ch'go	30.50	30.50	25.50	41.75
No. 1 hy. comp. sh't Det..	25.50	23.50	19.50	38.00
Low phos. Young'n.....	33.75	29.75	31.75	47.75
No. 1, cast, Pittsburgh...	39.50	39.50	39.50	70.00
No. 1, cast, Philadelphia.	37.00	37.00	35.50	66.50
No. 1, cast, Chicago.....	44.00	42.00	40.50	72.50

Coke: Connellsville:	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
(per net ton at oven)				
Furnace coke, prompt...	\$14.25	\$14.25	\$14.25	\$15.00
Foundry coke, prompt....	15.75	15.75	15.75	17.00

Nonferrous Metals:	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
(cents per pound to large buyers)				
Copper, electro, Conn....	18.50	17.625	17.625	23.50
Copper, Lake Conn.....	18.625	17.75	17.75	23.625
Tin Straits, New York...	94.00	94.00	96.00	\$1.03
Zinc, East St. Louis....	9.75	9.50	9.25	15.50
Lead, St. Louis.....	12.80	12.80	13.60	21.30
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	32.00	32.00	32.00	35.00

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
per gross ton....	\$45.88	\$28.92	\$28.92	\$28.92
per gross ton....	45.88	27.58	27.58	27.58
per gross ton....	45.88	26.58	26.58	26.58
per gross ton....	46.91	43.00	43.00	43.00

Scrap Steel	Nov. 8, 1949	Nov. 1, 1949	Oct. 11, 1949	Nov. 9, 1948
per gross ton....	\$43.00	\$19.33	\$19.33	\$19.33
per gross ton....	43.16	39.75	39.75	39.75
per gross ton....	42.58	29.50	29.50	29.50
per gross ton....	31.17	19.17	19.17	19.17
per gross ton....	19.17	18.92	18.92	18.92
per gross ton....	19.17	15.76	15.76	15.76
per gross ton....	19.17	19.17	19.17	19.17
per gross ton....	22.00	19.17	19.17	19.17
per gross ton....	21.83	16.04	16.04	16.04
per gross ton....	22.50	14.08	14.08	14.08
per gross ton....	15.00	11.00	11.00	11.00
per gross ton....	21.92	12.67	12.67	12.67
per gross ton....	17.75	12.67	12.67	12.67
per gross ton....	13.42	10.33	10.33	10.33
per gross ton....	13.00	9.50	9.50	9.50
per gross ton....	12.25	6.75	6.75	6.75
per gross ton....	8.50	6.43	6.43	6.43
per gross ton....	11.33	8.50	8.50	8.50
per gross ton....	17.58	14.08	14.08	14.08

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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IRON AGE

STEEL
PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middle- town	Youngs- town	Bethle- hem	Buffalo	Consho- hocken	Johns- town	Spar- rows Point	Granite City	Detroit
INGOTS														
Carbon forging, net ton	\$50.00 1													\$50.00 31
Alloy, net ton	\$51.00 1,17													\$51.00 31
BILLETS, BLOOMS, SLABS														
Carbon, rerolling net ton	\$52.00 1	\$52.00 1	\$52.00 1				\$52.00 13		\$52.00 3	\$57.00 26	\$52.00 3			
Carbon forging billets, net ton	\$61.00 1	\$61.00 1,4	\$61.00 1,8	\$61.00 4			\$61.00 25		\$61.00 3,4	\$63.00 26	\$61.00 3			\$61.00 31
Alloy, net ton	\$63.00 1,17	\$63.00 1,4	\$63.00 1		\$63.00 4,42		\$63.00 13	\$63.00 3	\$63.00 3,4	\$65.00 26	\$63.00 3			\$63.00 31
SHEET BARS							\$52.00 13							
PIPE SKELP	3.25 1,5						3.25 1,4							
WIRE RODS	3.40 2,18	3.40 2,4,33	3.40 6	3.40 2			3.40 6				3.40 3	3.50 3		
SHEETS														
Hot-rolled (18 ga. & hvr.)	3.25 1,5,9,15	3.25 23	3.25 1,6,8	3.25 4,5			3.25 1,4,6,13		3.25 3	3.35 26		3.25 3		3.45 12
Cold-rolled	4.00 ^{1,5} 7,9,15,63		4.00 1,6,8	4.00 4,5		4.00 7	4.00 4,6		4.00 3			4.00 3	4.20 22	4.20 12
Galvanized (10 gage)	4.40 1,9,15		4.40 1,8		4.40 4		4.40 6,4					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1,5	4.40 4		4.40 7	4.40 6						4.60 22	4.70 12
Long tennes (10 gage)	4.80 9,15		4.80 1			4.80 7								
Hi Str. low alloy, h.r.	4.95 1,5,9	4.95 1	4.95 1,6,8	4.95 4,5			4.95 1,4,6,13		4.95 3	4.95 26		4.95 3		5.15 12
Hi Str. low alloy, c.r.	6.05 1,5		6.05 1,6,8	6.05 4,5			6.05 4,6,13		6.05 3			6.05 3		6.25 12
Hi Str. Low alloy, galv.	6.75 1			6.75 4	6.75 4							6.75 3		
STRIP														
Hot-rolled	3.25 5,7,9,25	3.25 23,66	3.25 1,6,8	3.25 5			3.25 1,4,6,13		3.25 3			3.25 3		3.45 12,47
Cold-rolled	4.00 5,7,9,63	4.15 66	4.00 8	4.00 2,5		4.00 7	4.00 4,6,13,40,48,49		4.00 3			4.00 3		4.20 ^{1,2,47} 4.25 ^{5,8,51}
Hi Str. low alloy, h.r.	4.95 5		4.95 1,6,8	4.95 5			4.95 1,4,6,13		4.95 3			4.95 3		5.15 12
Hi Str. low alloy c.r.	6.05 5,9			6.05 2,5			6.05 4,6,13		6.05 3			6.05 3		6.25 12
TINPLATE¹														
Cokes, 1.50-lb. base box	\$7.75 1,5,9,15		\$7.75 1,6,8				\$7.75 4					\$7.85 3	\$7.95 22	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct \$1.30, \$1.05 and 75¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage	5.30 1,5,15		5.30 1,6,8				5.30 4					5.40 3	5.50 22	
Hollowware enameling														
BARS														
Carbon steel	3.35 1,5,9,17	3.35 1,4,23	3.35 1,6,8	3.35 4	3.35 4		3.35 1,4,6		3.35 2,4		3.35 3			3.55 12
Reinforcing††	3.35 1,5	3.35 4	3.35 1,6,8	3.35 4	3.35 4		3.35 1,4,6		3.35 2,4		3.35 3	3.35 3		
Cold-finished	3.95 ⁵ 4.00 ^{2,4} 17,52,69,71	4.00 ² 23,69,70	4.00 4,78,74	4.00 2,61	4.00 4,82		4.00 6,40,57		4.00 70					4.30 12
Alloy, hot-rolled	3.75 1,17	3.75 1,4,23	3.75 1,6,8		3.75 4,42		3.75 1,6,25	3.75 3	3.75 3,4		3.75 3			4.05 12
Alloy, cold-drawn	4.65 2,17,52,69,71	4.65 2,23,69,70	4.65 4,78,74	4.65 2,61	4.65 4,42,82		4.65 6,25,57	4.65 3	4.65 3,70					
Hi Str. low alloy, h.r.	5.10 1,5		5.10 1,6,8	5.10 4			5.10 1,6	5.10 3	5.10 3		5.10 3			5.30 12
PLATE														
Carbon Steel	3.40 1,5	3.40 1	3.40 1,6,8	3.40 4			3.40 13		3.40 3	3.50 26	3.40 3	3.40 3		3.65 12
Floor plates	4.55 1	4.55 1	4.55 8	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi Str. low alloy	5.20 1,5	5.20 1	5.20 1,8	5.20 4,5			5.20 6			5.20 26	5.20 3	5.20 3		5.45 12
SHAPES, Structural														
Hi Str. low alloy	3.25 1,5,9	3.25 1,23	3.25 1,6,8					3.30 3	3.30 8		3.30 3			
	4.95 1,5	4.95 1	4.95 1,6,8				4.95 6	5.05 3	5.05 3		5.05 3			
MANUFACTURERS' WIRE														
Bright	4.15 2,5,18	4.15 ² 4,23,34		4.15 2,77			4.15 6				4.15 3	4.25 3		Duluth=4.15 ² Pueblo=4.50 ^{1,4}
PILING, Steel sheet	4.05 1,9	4.05 1							4.05 3					

Smaller numbers indicate producing companies. See key at right.
Prices are in cents per lb unless otherwise noted. Extras apply.

IRON AGE

STEEL PRICES

KEY TO STEEL PRODUCERS

With Principal Offices

- 1 Carnegie-Illinois Steel Corp., Pittsburgh
- 2 American Steel & Wire Co., Cleveland
- 3 Bethlehem Steel Co., Bethlehem
- 4 Republic Steel Corp., Cleveland
- 5 Jones & Laughlin Steel Corp., Pittsburgh
- 6 Youngstown Sheet & Tube Co., Youngstown
- 7 Armco Steel Corp., Middletown, Ohio
- 8 Inland Steel Co., Chicago
- 9 Weirton Steel Co., Weirton, W. Va.
- 10 National Tube Co., Pittsburgh
- 11 Tennessee Coal, Iron & R.R. Co., Birmingham
- 12 Great Lakes Steel Corp., Detroit
- 13 Sharon Steel Corp., Sharon, Pa.
- 14 Colorado Fuel & Iron Corp., Denver
- 15 Wheeling Steel Corp., Wheeling, W. Va.
- 16 Geneva Steel Co., Salt Lake City
- 17 Crucible Steel Co. of America, New York
- 18 Pittsburgh Steel Co., Pittsburgh
- 19 Kaiser Co., Inc., Oakland, Calif.
- 20 Portsmouth Steel Corp., Portsmouth, Ohio
- 21 Lukens Steel Co., Coatesville, Pa.
- 22 Granite City Steel Co., Granite City, Ill.
- 23 Wisconsin Steel Co., South Chicago, Ill.
- 24 Columbia Steel Co., San Francisco
- 25 Copperweld Steel Co., Glassport, Pa.
- 26 Alan Wood Steel Co., Conshohocken, Pa.
- 27 Midvale Co., Philadelphia
- 28 Allegheny Ludlum Steel Corp., Pittsburgh
- 29 Worth Steel Co., Claymont, Del.
- 30 Continental Steel Corp., Kokomo, Ind.
- 31 Rotary Electric Steel Co., Detroit
- 32 Laclede Steel Co., St. Louis
- 33 Northwestern Steel & Wire Co., Sterling, Ill.
- 34 Keystone Steel & Wire Co., Peoria, Ill.
- 35 Central Iron & Steel Co., Harrisburg, Pa.
- 36 Carpenter Steel Co., Reading, Pa.
- 37 Eastern Stainless Steel Corp., Baltimore
- 38 Washington Steel Corp., Washington, Pa.
- 39 Jessop Steel Co., Washington, Pa.
- 40 Blair Strip Steel Co., New Castle, Pa.
- 41 Superior Steel Corp., Carnegie, Pa.
- 42 Timken Steel & Tube Div., Canton, Ohio
- 43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
- 44 American Chain & Cable Co., Inc., New York
- 45 John A. Roebling's Sons Co., Trenton, N. J.
- 46 Simonds Saw & Steel Co., Fitchburg, Mass.
- 47 McLouth Steel Corp., Detroit
- 48 Cold Metal Products Co., Youngstown
- 49 Thomas Steel Co., Warren, Ohio
- 50 Wilson Steel & Wire Co., Chicago
- 51 Sweet's Steel Co., Williamsport, Pa.
- 52 Superior Drawn Steel Co., Monaca, Pa.
- 53 A. M. Byers Co., Pittsburgh
- 54 Fifth Sterling Steel & Carbide Corp., McKeesport, Pa.
- 55 Ingersoll Steel Div., Chicago
- 56 Latrobe Electric Steel Co., Latrobe, Pa.
- 57 Fitzsimons Steel Co., Youngstown
- 58 Stanley Works, New Britain, Conn.
- 59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
- 60 Vanadium-Alloys Steel Co., Latrobe, Pa.
- 61 Cuyahoga Steel & Wire Co., Cleveland
- 62 Bethlehem Pacific Coast Steel Corp., San Francisco
- 63 Follansbee Steel Corp., Pittsburgh
- 64 Niles Rolling Mill Co., Niles, Ohio
- 65 Atlantic Steel Co., Atlanta
- 66 Acme Steel Co., Chicago
- 67 Joslyn Mfg. & Supply Co., Chicago
- 68 Detroit Steel Corp., Detroit
- 69 Wyckoff Steel Co., Pittsburgh
- 70 Bliss & Laughlin, Inc., Harvey, Ill.
- 71 Columbia Steel & Shaffing Co., Pittsburgh
- 72 Cumberland Steel Co., Cumberland, Md.
- 73 La Salle Steel Co., Chicago
- 74 Monarch Steel Co., Inc., Indianapolis
- 75 Empire Steel Co., Mansfield, Ohio
- 76 Mahoning Valley Steel Co., Niles, Ohio
- 77 Oliver Iron & Steel Co., Pittsburgh
- 78 Pittsburgh Screw & Bolt Co., Pittsburgh
- 79 Standard Forgings Corp., Chicago
- 80 Driver Harris Co., Harrison, N. J.
- 81 Detroit Tube & Steel Div., Detroit
- 82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
- 83 Sheffield Steel Corp., Kansas City

UNIVERSITY OF MICHIGAN LIBRARIES

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
	\$59.00 ⁸³				INGOTS Carbon forging, net ton
		\$52.00 ¹¹	F = \$71.00 ¹⁹		Alloy, net ton
	\$69.00 ⁸³	\$61.00 ¹¹	F = \$80.00 ¹⁹	Geneva = \$61.00 ¹⁶	BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	\$71.00 ⁸³		F = \$82.00 ¹⁹		Carbon forging billets, net ton
				Mansfield = \$58.00 G. T. ⁷⁵ Portsmouth = \$55.00 ²⁰	Alloy net ton
					SHEET BARS
					PIPE SKELP
	3.95 ⁸³		SF, LA = 4.05 ²⁴ LA = 4.20 ⁶²	Portsmouth = 3.40 ²⁰ Worcester = 3.70 ²	WIRE RODS
		3.25 ⁴⁻¹¹	LA = 3.95 ²⁴ F = 4.15 ¹⁹	Kokomo, ¹⁰ Ashland ⁷ = 3.25	SHEETS Hot-rolled (18 ga. & hvr.)
		4.00 ¹¹	SF = 4.95 ²⁴ F = 4.90 ¹⁹		Cold-rolled
		4.40 ⁴⁻¹¹	SF, LA = 5.15 ²⁴	Ashland = 4.40 ⁷	Galvanized (10 gage)
					Enameling (12 gage)
		4.95 ¹¹			Long ternes (10 gage)
					Hi Str. low alloy, h.r.
					Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.85 ⁸³	3.65 ⁸³	3.25 ¹¹	SF, LA = 4.00 ⁶² F = 4.40 ¹⁹ , S = 4.25 ⁶²	Ashland = 3.25 ⁷ Atlanta = 3.40 ⁶⁵	STRIP Hot-rolled
			F = 4.90 ¹⁹	New Haven = 4.50 ²⁻⁶⁸	Cold-rolled
		4.95 ¹¹			Hi Str. low alloy, h.r.
			F = 6.95 ¹⁹		Hi Str. low alloy, c.r.
			\$7.85 ¹¹		TINPLATE Cokes, 1.50-lb. base box
Deduct \$1.30, \$1.05 and 75c respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
3.95 ⁸³	3.75 ⁸³	3.35 ⁴⁻¹¹	SF, LA = 4.05 ²⁴ LA = 4.05 ⁶²	Atlanta = 3.50 ⁶⁵	BARS Carbon steel
3.95 ⁸³	3.75 ⁸³	3.35 ⁴⁻¹¹	SF, S = 4.10 ⁶² F = 4.00 ¹⁹	Atlanta = 3.50 ⁶⁵	Reinforcing††
				Putnam, Newark = 4.40 ⁶⁹ Cumberland = 3.95 ⁷²	Cold-finished
4.35 ⁸³			LA = 4.80 ⁶² F = 4.75 ¹⁹		Alloy, hot-rolled
				Newark, ⁶⁹ Worcester ² = 4.95	Alloy, cold-drawn
		5.10 ⁴			Hi Str. low alloy, h.r.
	3.80 ⁸³	3.40 ⁴⁻¹¹	F = 4.00 ¹⁹ S = 4.30 ⁶² Geneva = 3.40 ¹⁶	Claymont = 3.50 ²⁹ Coatesville = 3.50 ²¹ Harrisburg = 3.75 ³⁵	PLATE Carbon steel
				Harrisburg = 4.55 ³⁵	Floor plates
				Coatesville = 4.50 ²¹	Alloy
		5.20 ¹¹		Geneva = 5.20 ¹⁶	Hi Str. low alloy
3.65 ⁸³	3.65 ⁸³	3.25 ¹¹	SF = 3.80 ⁶² LA = 3.85 ⁶² , 3.95 ²⁴		SHAPES, Structural
		4.95 ¹¹	F = 3.80 ¹⁹ S = 3.90 ⁶²		Hi Str. low alloy
4.75 ⁸³	4.55 ⁸³	4.15 ⁴⁻¹¹	SF, LA = 5.10 ²⁴ LA = 5.10 ⁶²	Portsmouth = 4.15 ²⁰ Worcester = 4.45 ²	MANUFACTURERS' WIRE Bright

Notes: †Special coated mfg ternes, deduct \$1.10 from 1.50-lb coke base box price.
Can-making quality blackplate, 55 to 128-lb, deduct \$2.00 from 1.50-lb coke base box.
†Straight lengths only from producer to fabricator.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column Pittsburg, Calif.
Standard & coated nails*	103
Woven wire fence†	109
Fence posts, carloads††	112
Single loop bale ties	106
Galvanized barbed wire**	123
Twisted barbless wire	123

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 Columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†	\$4.80	\$5.75
Annealed, galv. fencing†	5.25	6.20
Cut nails, carloads††	6.75	...

† Add 30¢ at Worcester; 10¢ at Sparrows Pt.

†† Less 20¢ to jobbers.

PRODUCING POINTS — Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire: Alabama City, Ala., 4; Atlanta, 65; Alliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City (except bale ties), 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. (21)...	*26.50	
Washgtn, Pa. (39)...	*26.50	
Claymont, Del. (29)...	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)...	*26.50	*24.00
Nickel-carbon		
10 pct, Coatesville, (26)...	27.50	
Inconel-carbon		
10 pct, Coatesville, (21)...	36.00	
Monel-carbon		
10 pct, Coatesville, (21)...	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (41)		75.00
Aluminized steel sheets, hot dip, Butler, Pa., (7).....		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Folsanbee, W. Va., 63; Granite City, Ill., 22; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Toronto, Ohio, 63; Vandergrift, Pa. 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on previous page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter....	35
9/16 & ¾ in. x 6 in. & shorter.....	37
¾ in. & larger x 6 in. shorter.....	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. & longer....	35
Lag, all diam x 6 in. & shorter.....	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed (Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1¼ to 1½ in. inclusive	32
1½ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	38	41
¾ in. and smaller	38	39
¾ in. through 1 in.	37	37
9/16 in. through 1 in.	37	37
1¼ in. through 1½ in.	35	37
1½ in. and larger	28	28

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

	(½ in. and larger)
	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

	(7/16 in. and smaller)
	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

	(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright		46
¾ to 1 in. x 6 in., SAE (1035), heat treated		35
Milled studs		19
Flat head cap screws, listed sizes		5
Fillister head cap, listed sizes.....		28

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	\$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

After Dec. 31, 1948, increases or decreases in Upper Lake freight, dock and handling charges and taxes thereon to be for the buyers' account.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	\$3.20
Joint bars, per 100 lb.....	4.25
Light rails per 100 lb.....	3.55

Base Price cents per lb

Track spikes†	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburgh, Torr., Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

†Kansas City, 5.60¢.

PRODUCING POINTS—Standard rails: Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 7, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburgh, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

	W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	—	90.5¢
18	4	1	—	—	5	\$1.42
18	4	2	—	—	—	\$1.025
1.5	4	1.5	8	—	—	65¢
6	4	2	6	—	—	69.5¢
High-carbon-chromium						62¢
Oil hardened manganese						39¢
Special carbon						26.5¢
Extra carbon						22¢
Regular carbon						19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$14.00 to \$14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	\$15.50 to \$16.00
Foundry, oven coke	
Buffalo, del'd	\$20.90
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	\$20.25 to 21.04
Cleveland, del'd	23.63
Cincinnati, del'd	21.71
St. Paul, f.o.b.	23.50
St. Louis, del'd	21.60
Birmingham, del'd	19.75

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF₂ content: 70% or more \$37.00 60% or less \$4.00

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 15c to base price except Cincinnati
and New Orleans (*), add 10c; New York, Chicago and Boston, add 20c.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-30 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21- 6.41	6.95- 7.11	5.37	....	5.56	5.38	5.42	6.18	....	9.80- 10.10	....	....
Birmingham	4.85	5.75	6.15	4.85	....	5.10	4.90	4.90	6.59	....	....	....	....
Boston	5.55	6.45- 6.75	7.11- 7.61	5.60	6.75	5.75	5.42	5.52	6.02	9.36- 9.67	9.67- 9.87	10.72	11.02
Buffalo	4.65	5.75	7.42- 7.57	5.24	7.27	5.35	5.00	4.95	5.40	9.30	9.60	10.65	10.95
Chicago	4.85	5.75	6.85	4.85	5.45- 6.15	5.10	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Cincinnati*	5.16- 5.51	5.84- 6.28	6.59- 6.93	5.28- 5.43	....	5.53- 5.85	5.33	5.33- 5.48	6.08- 6.20	9.74	9.99	11.19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5.21	5.01	5.01	5.45	9.05	9.35	10.40	10.70
Detroit	5.28- 5.32	6.07- 6.18	7.38- 7.58	5.27- 5.47	6.27- 6.58	5.52- 5.57	5.33- 5.40	5.33- 5.55	6.00- 6.10	9.67	9.92	11.11	11.35
Houston	6.70- 6.95	....	7.30	6.70	....	6.70	6.20- 6.70	6.40- 6.65	7.60	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.36	5.54	5.34	5.34	6.14	11.25	11.39	....	....
Kansas City	5.50	6.40	7.50	5.50	6.95	5.75	5.55	5.55	6.10	9.55	9.85	10.90	11.20
Los Angeles	5.45	7.00	7.45	5.95	7.35*	5.50	5.45	5.60	7.25	....	....	....	....
Murphy	5.75- 5.80	6.60	7.20	5.80- 5.95	6.80	5.95- 6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.02	5.03- 5.38	6.32	5.28	5.08	5.08	5.63	9.08	9.38	10.43	10.73
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65*	....	....	....	....
New York	5.40	6.31	6.85- 6.90	5.62	6.76	5.65	5.33	5.57	6.31	9.28	9.58	10.63	10.93
Norfolk	6.08	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	4.95	6.24 ¹³	6.63	5.40	6.29	5.35	5.10	5.40	5.96	9.05	9.35	10.62	10.87
Pittsburgh	4.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.58
Portland	6.50*- 7.05	8.00	8.80- 9.10	6.85*	....	6.30*	6.35*	6.35*	8.25 ¹⁴	10.50*	10.10*	....	....
Salt Lake City	7.05	7.05	8.65	7.45 ³	....	5.65 ³	5.50 ³	7.10 ⁸	8.15	....	....	....	....
San Francisco	6.15 ⁸	7.50 ²	7.80	6.75 ⁸	8.25 ⁵	6.35 ⁸	5.90 ⁸	5.90 ⁸	7.55	9.80	10.00	11.20	11.60
Seattle	6.70 ⁴ - 7.10	8.15 ³ - 8.65	8.80- 9.30	6.70 ⁴	....	6.35 ⁴	6.30 ⁴	6.20 ⁴	8.15 ¹⁴	....	10.35 ¹³	....	13.10 ¹³
St. Louis	5.22- 5.37	6.12- 6.27	7.32	5.22	6.68- 7.54	5.47	5.27	5.27	5.82	9.27- 9.72	9.57- 9.97	10.62- 11.17	10.92- 11.42
St. Paul	5.44	6.19- 6.34	7.54- 7.64	5.44	6.82	5.64- 6.69	5.49	5.49	6.04	9.49	9.79	10.84	11.14

BASE QUANTITIES Standard unless otherwise keyed on prices.

Hot-Rolled:
Sheets, strip, plates, shapes and bars, 400 to
1000 lb.Cold-Rolled:
Sheets, 400 to 1499 lb strip, extras on all
quantities. Bars 1000 lb and over.

Alloy Bars:

1000 to 1999 lb.

Galvanized Sheets:

450 to 1499 lb.

Exceptions:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999
lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000
lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over;
(9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999
lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1800
lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and
over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19)
1500 to 3499 lb; (20) 6000 lb and over.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malle-able	Besse-mer	Low Phos.	Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malle-able	Besse-mer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....	Boston	Everett	\$0.50 Arb.	.....	50.50	51.00	.....	.....
Birmingham	38.88	39.38	.....	.....	.....	Boston	Steelton	6.90	.....	.....	.....	.....	50.90
Buffalo	46.00	46.50	47.00	.....	.....	Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Chicago	46.00	46.50	46.50	47.00	.....	Cincinnati	Birmingham	6.70	46.58	46.08	.....	.....	.....
Cleveland	46.00	46.50	46.50	47.00	51.00	Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Duluth	46.00	46.50	46.50	47.00	.....	Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Erie	46.00	46.50	46.50	47.00	.....	Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Everett	.....	50.50	51.00	.....	.....	Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Granite City	47.90	48.40	48.90	.....	.....	Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Ironton, Utah	46.00	46.50	.....	.....	.....	Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Pittsburgh	46.00	46.50	46.50	47.00	.....	Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
Geneva, Utah	46.00	46.50	.....	.....	.....	San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....	Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Steelton	46.00	46.50	49.00	49.50	54.00	St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Swedeland, Ohio	46.00	.....	.....	.....	.....	Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....
Swedeland	46.00	46.50	49.00	49.50	.....							
Toledo	46.00	46.50	46.50	47.00	.....							
Troy, N. Y.	46.00	46.50	49.00	.....	54.00								
Youngstown	46.00	46.50	46.50	47.00	.....							

Producing point prices are sub-
ject to switching charges; silicon
differential (not to exceed 50c per ton
for each 0.25 pct silicon content in
excess of base grade which is 1.75 to
2.25 pct for foundry iron); phos-
phorus differentials, a reduction of
50c per ton for phosphorus content of
0.70 pct and over manganese differ-
entials, a charge not to exceed 50c
per ton for each 0.50 pct manganesecontent in excess of 1.00 pct. 82 per
ton extra may be charged for 0.5
to 0.75 pct nickel content and \$1 per
ton extra for each additional 0.25 pct
nickel.Silvery iron (blast furnace) silicon
6.01 to 6.50 pct. C/L per g.t., f.o.b.
Jackson, Ohio—\$59.50; f.o.b. Buffalo,
\$60.75. Add \$1.00 per ton for each
additional 0.50 pct Si up to 17 pct.Add 50c per ton for each 0.50 pct Mn
over 1.00 pct. Add \$1.00 per ton for
0.75 pct or more P. Bessemer ferro-
silicon prices are \$1.00 per ton above
silvery iron prices of comparable
analysis.Charcoal pig iron base price for
low phosphorus \$60.00 per gross ton,
f.o.b. Lyle, Tenn. Delivered Chicago,
\$68.56. High phosphorus charcoal pig
iron is not being produced.

FERROALLOYS

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.	
F.o.b. Birmingham	\$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	\$172
F.o.b. Johnstown, Pa.	\$174
F.o.b. Sheridan, Pa.	\$172
F.o.b. Etna, Clairton, Pa.	\$175
\$2.00 for each 1% above 82% Mn, penalty, \$2.15 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.	
16-19% Mn 19-21% Mn	
3% max. Si 3% max. Si	
Palmerton, Pa. \$64.00 \$65.00	
Pgh. or Chicago 65.00 66.00	

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.	
Carloads Ton Less	
0.07% max. C, 0.06% P, 90% Mn	25.25 27.10 28.30
0.10% max. C	24.75 26.60 27.80
0.15% max. C	24.25 26.10 27.30
0.30% max. C	23.75 25.60 26.80
0.50% max. C	23.25 25.10 26.30
0.75% max. C	
7.00% max. Si	20.25 22.10 23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.	
Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$73.50. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50% Mn over 1%.	
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Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.	
25% Si	17.00
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.	
Cast Turnings Distilled	
Ton lots	\$2.05 \$2.95 \$3.75
Less ton lots	2.40 3.30 4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered.	
(65-72% Cr, 2% max. Si)	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per pound of briquet, delivered, 60% chromium.	
Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.	
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S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.	
0.20% max. C	\$1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.	
30-33% Ca, 60-65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.	
Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	\$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.10
Ferrophosphorus, electrolytic, 23-26% carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti.	\$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti.	\$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	\$160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	\$2.90
Crucible	3.90
High speed steel (Primos)	3.10
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per lb contained Mo.	95¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Ton lots, packed, lump	11.75¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V ₂ O ₅ contract basis, per pound contained V ₂ O ₅	\$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	6.60¢
Carload, bulk	
Boron Agents	
Contract prices, per lb of alloy, del.	
Borasil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	\$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢

STAINLESS STEELS

Base prices, in cents per pound,
f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingot, rerolling.....	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging.....	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50	26.50
								27.00		
Sheets.....	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

Numbers correspond to producers. See Key on Steel Price pages.

STAINLESS STEEL PRODUCING POINTS—Sheets: Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38; 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks and rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago 1.

REFRACTORIES (F.o.b. works)

Fire Clay Brick	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill.	
(except Salina, Pa., add \$5).....	\$80.00
No. 1 Ohio.....	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio.....	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50).....	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	\$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	\$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

Standard chemically bonded, Balt., Chester	Per Net Ton
	\$69.00

Magnesite Brick

Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	Std. 3/4-in. grains	\$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines		\$30.50 to 31.00
in sacks with fines		35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10c; Missouri Valley, add 20c.....		\$12.25
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METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.		
Swedish sponge iron c.i.f.		
New York, ocean bags	7.4¢ to 9.0¢	

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about \$200.00 per net ton

Standard, Threaded and Coupled

Steel, butt weld*	Black	Galv
1/2-in.	43 to 41	26 1/2 to 24 1/2
3/4-in.	46 to 44	30 1/2 to 28 1/2
1-in.	48 1/2 to 46 1/2	33 1/2 to 31 1/2
1 1/4-in.	49 to 47	34 to 32 1/2
1 1/2-in.	49 1/2 to 47 1/2	34 1/2 to 32 1/2
2-in.	50 to 48	35 to 33
2 1/2 to 3-in.	50 1/2 to 48 1/2	35 1/2 to 33 1/2

Steel, lap weld

2-in.	39 1/2	26 to 24
2 1/2 to 3-in.	43 1/2 to 42 1/2	28 to 27
3 1/2 to 6-in.	46 1/2 to 42 1/2	31 to 27

Steel, seamless

2-in.	38 1/2	23
2 1/2 to 3-in.	41 1/2	26
3 1/2 to 6-in.	43 1/2	28

Wrought Iron, butt weld

1/2-in.	+20 1/2	+47
3/4-in.	+10 1/2	+36
1 & 1 1/4 in.	+4 1/2	+27
2-in.	+1 1/2	+23 1/2
3-in.	— 1 1/2	+23

Wrought Iron, lap weld

2-in.	+7 1/2	+31
2 1/2 to 3 1/2-in.	+5	+26 1/2
4-in.	list	+20 1/2
4 1/2 to 8-in.	+2	+22

Extra Strong, Plain Ends

Steel, butt weld		
1/2-in.	42 to 40	27 to 25
3/4-in.	46 to 44	31 to 30
1-in.	48 to 46	34 to 32
1 1/4-in.	48 1/2 to 46 1/2	34 1/2 to 32 1/2
1 1/2-in.	49 to 47	35 to 33
2-in.	49 1/2 to 47 1/2	35 1/2 to 34 1/2
2 1/2 to 3-in.	50 to 48	36 to 34

Steel, lap weld

2-in.	39 1/2 to 38 1/2	25 to 24
2 1/2 to 3-in.	44 1/2 to 42 1/2	30 to 28
3 1/2 to 6-in.	48 to 44	33 1/2 to 31 1/2

Steel, seamless

2-in.	37 1/2	23
2 1/2 to 3-in.	41 1/2	27
3 1/2 to 6-in.	45	30 1/2

Wrought Iron, butt weld

1/2-in.	+16	+40
3/4-in.	+9 1/2	+34
1 to 2-in.	— 1 1/2	+23

Wrought Iron, lap weld

2-in.	+4 1/2	+27 1/2
2 1/2 to 4-in.	— 5	+16
4 1/2 to 6-in.	— 1	+20 1/2

For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

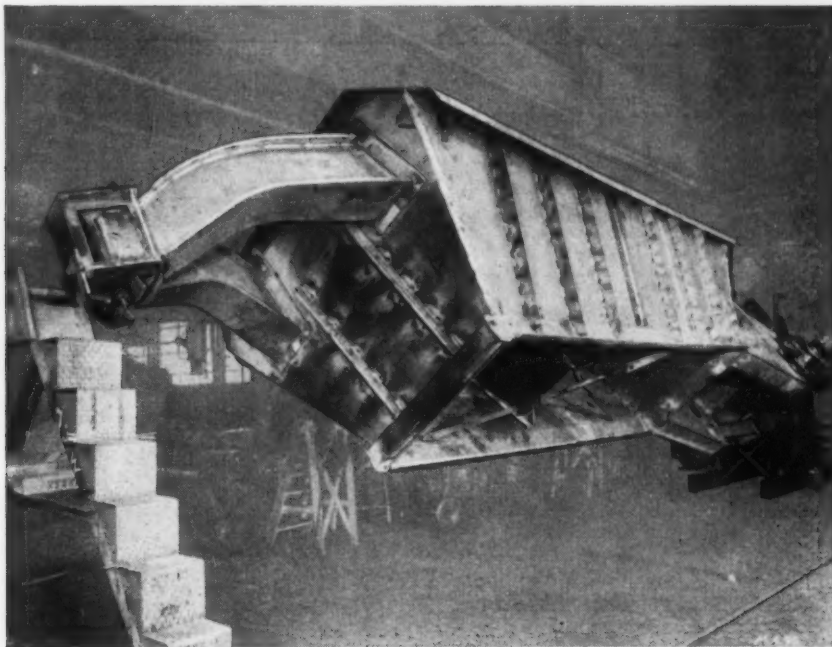
BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage	Seamless	Electric Weld
in. BWG	H.R.	C.R.
2 1/2 13	\$19.18	\$22.56
2 1/2 12	25.79	30.33
3 1/2 12	28.68	33.76
3 1/2 11	35.85	42.20
4 10	44.51	52.35

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$95.70
6 to 24-in., del'd N. Y.	\$92.50 to 97.40
6 to 24-in., Birmingham	82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	109.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	



VAN DORN

Weldments Feature

★ **Strength**

★ **Uniformity**

★ **Economy**

Yes, Van Dorn Weldments are widely known for their outstanding quality—for they are backed by Van Dorn's complete fabricating facilities . . . experienced design engineers . . . specially trained workmen . . . 77 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th Street, Cleveland 4, Ohio.



Send For FREE WELDMENT BOOK

● Profusely illustrated; describes the many advantages of weldments, and Van Dorn's extensive facilities.

Iron Age
Introduces

Continued from Page 23

Lloyd J. Bohan has been named west coast representative of A. F. HOLDEN CO, New Haven, Conn. Mr. Bohan has been associated with the metalworking industry for 14 years.



ELIAS C. ATKINS III, assistant to vice-president, E. C. Atkins & Co.

Elias C. Atkins III has been promoted to assistant to the vice-president of E. C. ATKINS AND CO., Portland, Ore.

Samuel P. Crago has been appointed assistant factory manager of Hamilton Standard Div. of UNITED AIRCRAFT CORP., East Hartford, Conn. Mr. Crago succeeds Nevin F. Decker, who has resigned the post due to ill health.

E. M. Baker has been appointed industrial relations manager of the Rouge Div. of the FORD MOTOR CO., Dearborn. Clarence Donovan has been named industrial relations manager of the automotive manufacturing operations, and Otis U. Walker to the same post for steel operations. William D. Singleton has been elected production manager of all Ford Div. assembly plants under M. L. Wiesmyer, manufacturing manager. William B. Smith has been appointed assistant manager of the Chester plant.

Michigan WELDED STEEL TUBING

Best for

The Modern Electric Resistance Welded Steel Tubing



ROUND
1/4" to 4" O. D. 9 to 22 gauge
SQUARE-RECTANGULAR
1/2" to 2" 20 gauge 1" to 2 3/4", 14, 16, 18 gauge

Today—when every manufacturer is seeking shortcuts in production and additional economies that will permit an equitable price reduction, many small shops and large factories are turning to welded steel tubing as the low-cost solution to their fabricating problems.

A Quality Product

IN ELECTRIC

Michigan **STEEL TUBE PRODUCTS CO.**

THE OLDEST NAME

33 Years in the Business
9450 BUFFALO STREET • DETROIT 12, MICHIGAN
FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

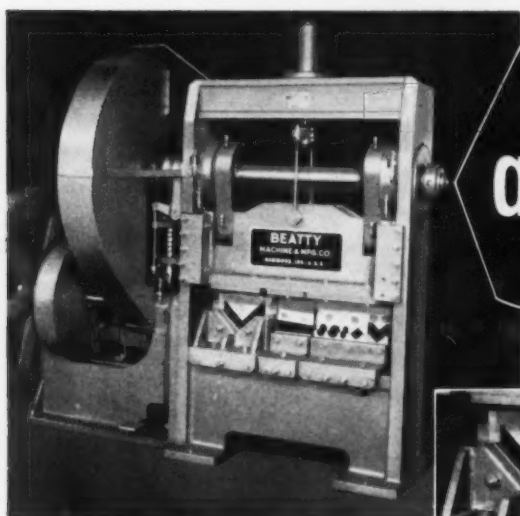
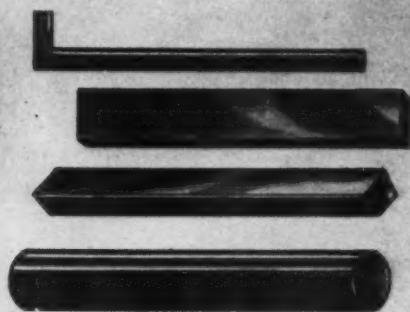
DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillsdale, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Drummond, McCall & Co., Ltd., Toronto, Canada.

For Engineering advice and technical help in the selection of tubing best suited to your needs consult us.

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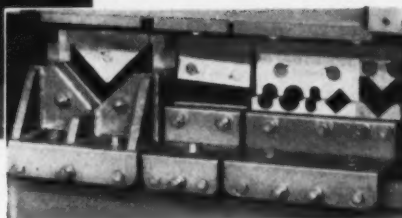


The problem was "short order" warehouse shearing — one of this, one of that, one of the other thing.



This new BEATTY No. 7 Guillotine Bar Shear provides the answer.

the
answer



New Beatty Guillotine Shear Solves "Short Order" Shearing

Typical of Beatty problem-solving is this new bar shear which allows for "short order" shearing of rounds, squares and bars *without* changing tools. The new machine offers a 48" base on which are mounted 2 sets of angle shear blades, 1 set for shearing flats, and blades to shear squares and 3 sizes of round bars. Other tools for shearing other shapes are available. Let Beatty engineers help solve your problems. These machines are built in capacities from 50 to 450-tons.

Write for data on this new Bar Shear



BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA



IRON AGE INTRODUCES

Continued

Donald C. Burdette has been named assistant parts and accessories sales manager, Ford Div. **Byron R. Lenhardt**, formerly accessories sales manager, has been appointed parts sales manager. **John B. Langley** will succeed Mr. Lenhardt as accessories sales manager. **D. R. Matthews** has been named sales promotion and training manager in the parts and accessories sales department.



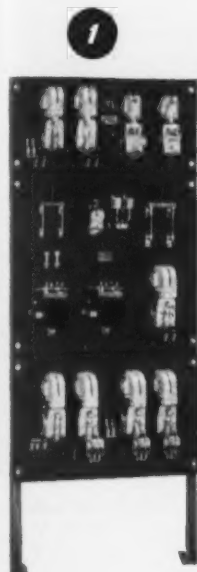
R. W. WALKER, manager Eastern Div., Mack-International Motor Truck Corp.

R. W. Walker has been named manager of the Eastern Div. of MACK-INTERNATIONAL MOTOR TRUCK CORP., New York. Mr. Walker has been with Mack for a quarter of a century. For the last 4 years he has been in charge of the company's metropolitan New York Div.

R. M. Westveer has been appointed general manager of the Bassick-Sack Div., of the BASSICK CO at Winston-Salem, N. C., filling the vacancy created by the death of **Ray M. Martin**. Mr. Westveer comes to Bassick-Sack after 2 years with Chautauqua Hardware Co.

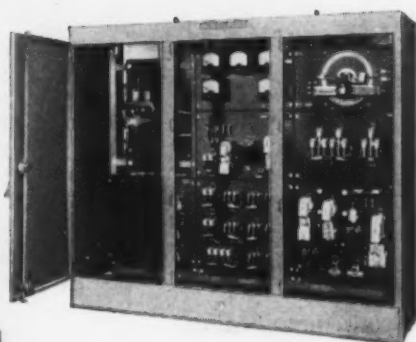
Kermit R. Sadler has been appointed general traffic manager of the B. F. GOODRICH CO., Akron, Ohio. Mr. Sadler succeeds **R. W. Corns** who has resigned. **H. E. Cook** chief engineer for many years, has been assigned to major engineering problems. **Frank Brown** has been appointed plant engineer of all Akron plants and

STANDARD AND SPECIAL HEAVY-DUTY D.C. MILL AUXILIARY & CRANE CONTROL

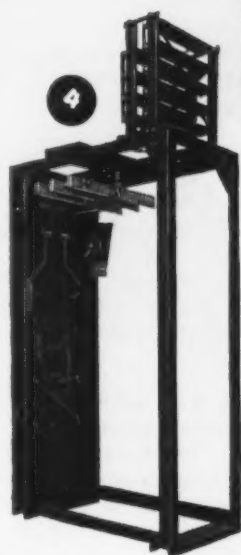


1 Dynamic Lowering Control Panel for cab-operated crane hoist. New network system gives surer hook control with only nine contactors. **STANDARD**

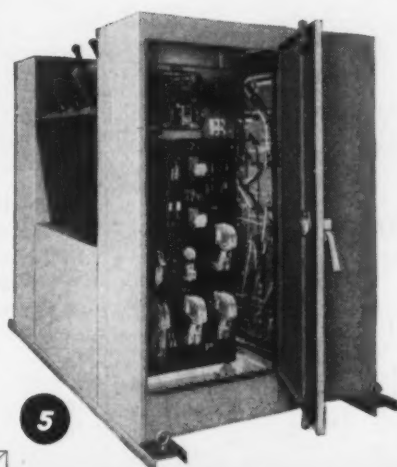
2 Steel Mill Auxiliary Controller for reversing, dynamic braking service. Features include automatic acceleration by pneumatic timers, mill type overload relays, heavy duty control relays and contactors. **STANDARD**



3 Variable Voltage Controller for continuous strip process line. With motor-operated field rheostat. **SPECIAL**



4 Sectionalized Mill Control Panel with frame, line bussing, resistor bank. **SPECIAL**



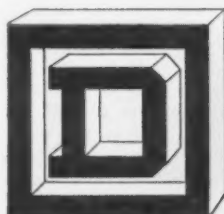
5 Benchboard and Control Cubicle for leveler and shear. Combination A.C. and D.C. control. **SPECIAL**

Do you have a Control Problem?

Trained Field Engineers are at your service through Square D offices in more than 50 principal cities.



Contact the nearest Square D Field Office or write direct to the Square D Company, 4041 N. Richards Street, Milwaukee 12, Wis.



SQUARE D COMPANY

DETROIT

MILWAUKEE

LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

UNIVERSITY OF MICHIGAN LIBRARIES



EC&M PLATE-MAGNETS *do it better* *save up to 90% in handling time*

Handling steel by a magnet is the fastest method known. Place the magnet on the work, turn on the power and steel is transported without delay. No time lost in affixing chains—no danger of pinching hands—the crane operator often works without a ground-man.

This plant uses several EC&M Plate-Magnets for loading, unloading, stacking and carrying steel to shears and other processing equipment. Picking up stubs around the shears keeps floor clean.

EC&M Plate-Magnets are built in several sizes for every handling need. Send us the facts of your operations so that we may write fully when sending Bulletin 903 describing EC&M Plate-Magnets.



Burned Plates, too, pull out easily when lifted by Magnet.

**TELL ALL FOR PROMPT
RECOMMENDATION**
Give an idea of your plant layout and equipment, and material handled, such as —
1. Style and capacity of crane.
2. Voltage available (direct current is required for magnets)
3. Overall dimensions and weight of material handled.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET

CLEVELAND 4, OHIO

IRON AGE INTRODUCES

Continued

George Murphy to the same post at Plant 4, reporting to Mr. Brown. Clifford R. Augden has been named superintendent of shops succeeding Mr. Brown.



J. F. BERGER, manager of sales for industrial wire products, Woven Wire Fabrics Div., John A. Roebling's Sons Co.

J. F. Berger has been elected manager of sales for industrial wire products of the Woven Wire Fabrics Div., JOHN A. ROEBLING'S SONS CO., Roebling, N. J. Samuel K. Hornor has been named manager of sales for hardware products.

Ralph W. Elmenthaler has been named liaison engineer on the Industrial Advertising staff of SURFACE COMBUSTION CORP., Toledo. He will prepare catalogs and publicity material on industrial furnace installations.

Charles E. Nail has been appointed assistant sales manager of the SHENANGO TUBE CO., Sharon, Pa. Mr. Nail will make his headquarters at the home office of the company.

John R. Shumway has been named traveling freight agent at Pittsburgh for the traffic department of the WABASH R. R. CO., St. Louis, succeeding C. B. Henthorne, who has retired.

M. C. Peterson and S. E. Ragland have been named to the field sales organization of WILLYS-OVERLAND MOTORS, INC., Toledo. Mr. Peterson was assistant general sales manager

McKAY

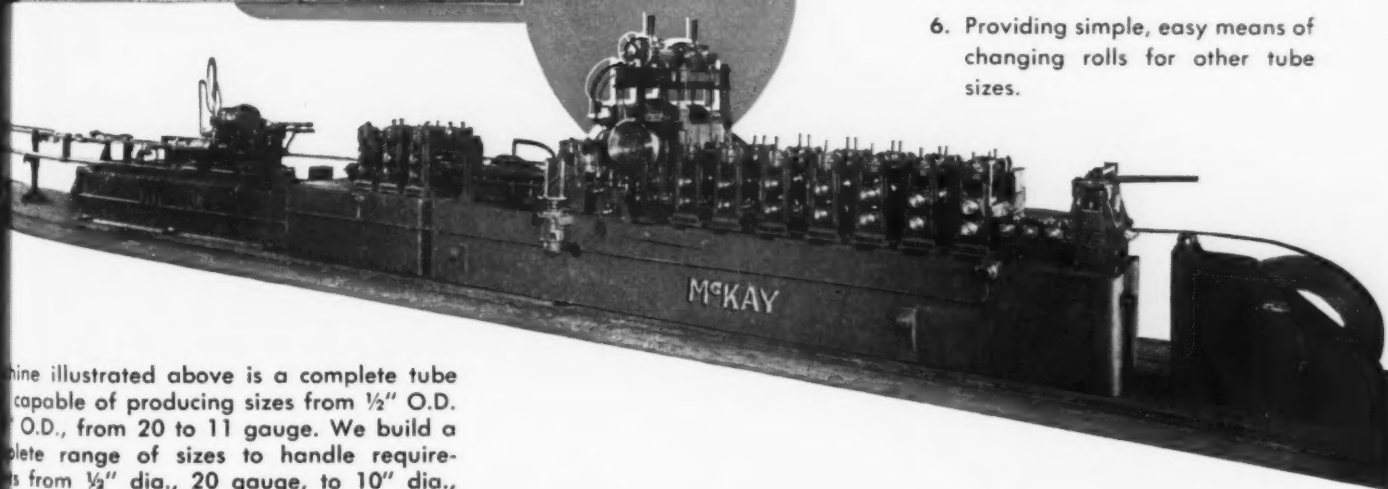
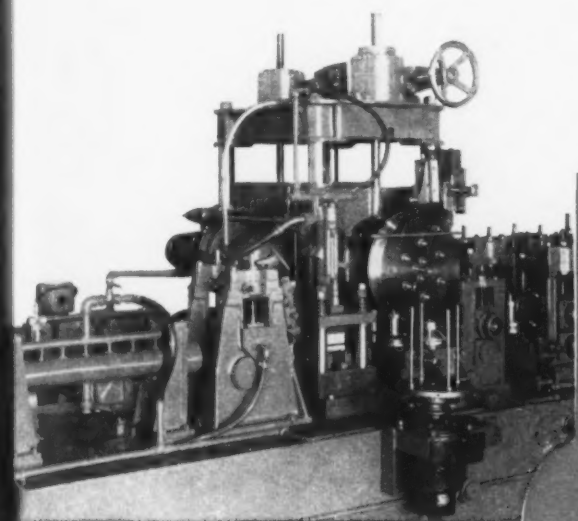
RESISTANCE WELD TUBE MILLS

McKay Electric Resistance Weld Tube Mills can be put to work quickly and easily in your plant, producing high quality tubing.

The heart of a tube mill is the welding unit. The combination of modern rotary transformer (patented) correctly mounted with proper voltage regulators permitting perfect matching of speed and heat while running, is the last word in efficient, accurate control of this all important unit. Welding electrodes accessible for changing without disturbing transformer, leads or bearings.

This has been accomplished by:

1. Simplifying and centralizing all necessary controls.
2. Complete protection through approved safety devices and interlocks.
3. Supplying motor drives and push button controls to essential heavy duty motions.
4. Eliminating necessity of welding from coil to coil — strip from coil threads itself through machine, without manual assistance.
5. Automatic Rotary Head Cut-off (patent pending) producing lathe cut and accurately maintaining desired lengths.
6. Providing simple, easy means of changing rolls for other tube sizes.



Machine illustrated above is a complete tube mill capable of producing sizes from 1/2" O.D. to 11" O.D., from 20 to 11 gauge. We build a complete range of sizes to handle requirements from 1/2" dia., 20 gauge, to 10" dia., 11 gauge wall. We also build a complete line of tube mill bar drawbenches. We solicit your business.

The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

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THIS H-P-M
Saves its owner
\$60,000
per year
on a single job!

That's just one of
many savings credited
to this H-P-M Press



These drawn cabinet tops—960 of them in 8 hours—for Lincoln's new "FLEET-ARC" welders also make a gasoline tank when welded together

Increased output, higher quality performance, lower labor and maintenance costs—add them up and this H-P-M Fastraverse Press shows annual savings of \$60,000 on one job alone for Lincoln Electric Company!

This is just one of the many jobs this versatile H-P-M Press performs. It forms heavy metal sections which replace castings. It coins parts that replace forgings—parts formerly purchased outside. As a result, many machining operations are eliminated, cutting Lincoln's costs and improving their competitive position.

For YOUR Protection

Take a tip from Lincoln Electric! Install H-P-Ms for deep-drawing, forging, die straightening, coining, forming and assembling operations. H-P-M presses are completely self-contained, all-hydraulic — easy to install, quick to set up, simple to operate, low on upkeep.

Ask an H-P-M engineer how you can save money with H-P-M presses, or write for the facts today.

Write today for copy of "CASE HISTORIES in the REDUCTION of METAL WORKING COSTS". It tells how manufacturing costs are being reduced in many prominent production plants by H-P-M pressure processing.



THE HYDRAULIC PRESS MFG. COMPANY

1006 Marlon Road, Mt. Gilead, Ohio

Branch Offices in New York, Philadelphia, Detroit, Pittsburgh and Chicago. Representatives in other principal cities. Export Dept.: 500 Fifth Avenue, New York, N. Y. Cable—"Hydraulic"



All-Hydraulic
Self-Contained

Metal Working Presses

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

IRON AGE INTRODUCES

Continued

of the Weatherhead Co. before joining Willys. Mr. Ragland was associated with the Carson Machine & Supply Co.



J. R. ROSE, sales manager of western district, Townsend Co.

J. R. Rose has been named sales manager of the Western district for TOWNSEND CO., New Brighton, Pa. Mr. Rose will have his headquarters in Chicago. Prior to coming with Townsend, he was a district sales manager for the Pennzoil Co.

George H. Wurster has been appointed sales representative in New England for HEPPENSTALL CO., Pittsburgh, succeeding Harold P. Jones who has retired. Mr. Jones had been affiliated with the company for 32 years.

N. L. Watkins has been named chief development engineer of the Almco Div. of QUEEN STOVE WORKS, INC., Albert Lea, Minn. Mr. Watkins was manufacturing engineer at Westinghouse Electric Corp. prior to his new assignment.

Walter E. Hoadley, Jr., has been appointed economist for the ARM-STRONG CORK CO., Lancaster. He is at present industrial economist of the Federal Reserve Bank of Chicago. He will leave the bank Nov. 10 to assume his new assignment.

Merton A. Robinson, chief ballistician of WINCHESTER REPEATING ARMS CO., New Haven, Conn., divi-



Studebaker USES "J" TYPE SPEED NUTS *Saves 35% on Fender Assembly Cost*

Right out of Studebaker's own cost estimate files comes this report of outstanding SPEED NUT savings.

To establish this saving factor, tests were made using 18 welding nuts to fasten the rear fenders to the body. Then, for comparison, 18 "J" Type SPEED NUTS were used to perform the same operation. The resulting statistics reveal that SPEED NUTS provide a 35% savings in material and assembly costs on this application.

This is one reason why there are hundreds of

SPEED NUT brand fasteners of various types used in the assembly of the 1950 Studebaker.

Here, too, is sufficient reason why you should investigate the SPEED NUT way to lower assembly costs and improved product quality. Ask your Tinnerman "Fastening Specialist" for information on the comprehensive Fastening Analysis Service . . . and write for your free copy of SPEED NUT Savings Stories. TINNERMAN PRODUCTS, INC., 2040 Fulton Road, Cleveland 13, Ohio. In Canada: Dominion Fasteners, Ltd., Hamilton.

"The Next Look in Cars"—
The 1950 Studebaker Land Cruiser

Thumb pressure snaps
"J" Type SPEED NUT over edge of
wheel house panel, in position
for blind location assembly.
Provides secure, vibration-proof
attachment on Acme bolt.

TINNERMAN *Speed Nuts*
FASTEST THING IN FASTENING

UNIVERSITY OF MICHIGAN LIBRARIES

Whatever you COMPARE with a Forging ACTUALLY EMPHASIZES the METAL QUALITY OF FORGINGS



Macro-etch through longitudinal cross section of crankshaft shows flow lines or fibre like structure that is common in high quality forgings.

A REFERENCE BOOK ON FORGINGS FOR ALL USERS OF METAL PARTS

Sixty (60) pages of authoritative information on metal quality as developed in forgings formed through the use of closed impression dies. Forging production techniques are described and illustrated; economic advantages of forgings are presented from the viewpoint of top management, design engineers, metallurgists and production executives. Your copy is ready. Fill in and attach coupon below to your business letterhead.

The uniformity of metal quality found in forgings cannot be duplicated! Now is an excellent time to check your product for cost reductions right down the line—explore every possibility to improve performance and appearance, while reducing dead weight of component parts. Double check all parts—particularly those which are subject to the greatest stress and strain. Check machining and finishing time schedules—forgings have been known to speed up production by as much as 250 per cent. Rejects at the point of assembly are costly, a needless waste

—forgings offer almost a 100 per cent yield of sound parts because forgings are unusually free of concealed defects. Check to see if some parts may not be combined into integral forgings—an obvious saving in finishing operations. Consult a forging engineer when checking parts—only a forging engineer can inform you fully regarding the many advantages obtainable with forgings.

**DROP FORGING
ASSOCIATION**
605 HANNA BUILDING
CLEVELAND 15, OHIO

DROP FORGING ASSOCIATION
605 Hanna Building • Cleveland 15, Ohio

Please send 60-page booklet entitled "Metal Quality—How Hot Working Improves Properties of Metal", 1949 Edition.

Name _____
Position _____
Company _____
Address _____

IRON AGE INTRODUCES

Continued

sion of Olin Industries, Inc. has retired after 45 years of service with the company. Mr. Robinson will still be available for ballistic consultation.



GEORGE R. LUNDBERG, director of advertising and sales promotion, Osborn Mfg. Co.

George R. Lundberg has been appointed director of advertising and sales promotion of the OSBORN MFG. CO., Cleveland. Mr. Lundberg has been associated with Osborn in various capacities for the past 17 years. Prior to his new appointment he was chief accountant.

O. B. "Tony" Motter, vice-president of GRAHAM - PAIGE MOTORS CORP., Detroit, has resigned to open his own public relations office. He will continue as a director of Graham-Paige and vice-president and director of Frazer Products Co.

Fred Denig has been appointed manager of the production department of KOPPERS CO., INC., Pittsburgh, succeeding Hugh C. Minton who has resigned because of ill health. G. Frank D'Alelio has been named vice-president and manager of the research department, the position formerly held by Mr. Denig. Dr. A. R. Powell has been made associate manager of the research department.

Rolland J. Hamilton, vice-president of the AMERICAN RADIATOR & STANDARD SANITARY CORP., Pittsburgh, has retired. He had been with the company for 45 years, and served in various executive capacities.

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Variable Idle Time Control
Gear Box Transmission Support
Headstock Transmission Support
Support by Work Spindle Carrier
Approved Types of Clutch
Power Reverse Drive Support to All Tools
Material and Finish
Proximity of Front Bearing to Carrier Face of Spindle
Support by Work Spindles
Support by Work Spindle Carrier Indexing Facility
Top Member Support to All Headstock and Gear Box Members
Support by Main Cross Slides
Form Tool Holder Interchangeability
Location of Tooling Stations in Respect to Chip Clearance and Size Control
Gear Material, Size and Finish
Main Cross Slide Positioning Accuracy
Camshaft Replacement Facility
Idle Time Movement Brake Adjustment
Endworking Attachment Spindle Mounting
Tool Holder Anchorage
Job Changeover Facility
Machine Builder's Block and Line Test
Proximity of Front Bearing to Spindle
Support by Main End Slide
Length of Standard Main End Slide
Maximum Machine Main End Slide Load Recommended
Main End Slide Replacement
Minimum Overhang

BUYER'S
COMPARISON CHART
FOR
MULTIPLE SPINDLE AUTOMATIC
BAR MACHINES

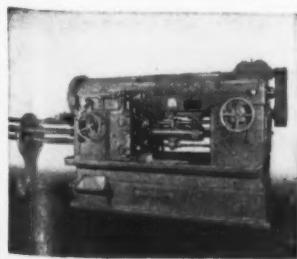
FULL INFORMATION PLEASE

Buyers of machine tools usually want ALL of the information about a machine, not just a part of it. And, with all of the information, they will give special attention to those things that have a bearing on their own particular requirements.

Case histories of machine performance in other plants clearly indicate that requirements often vary. But, for any requirement, machine performance is dependent on machine facility, and there is no better way of predetermining satisfactory quality performance than by determining a machine's quality facility.

All brands of a given type of machine offer value worthy of due consideration. A fair comparison of their facilities, in accordance with the requirements they must meet, is a logical means of establishing a preference.

For those interested in determining the facilities of multiple spindle automatic bar machines CONE has made available an analysis chart. It is designed to help guide you to ALL the information. Your copy is free. There is no obligation.



A comparison
will lead you to

Conomatic}

CONE AUTOMATIC
MACHINE COMPANY, INC.
WINDSOR, VT., U.S.A.

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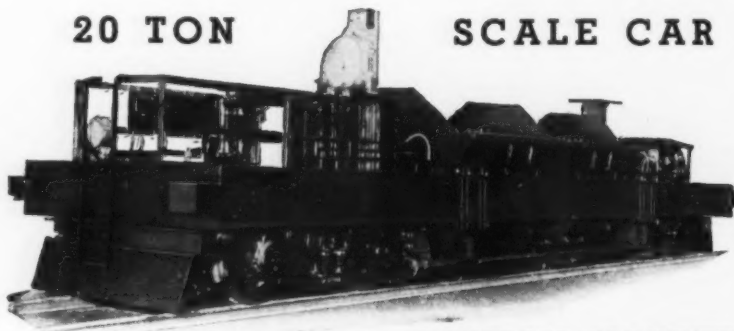
ATLAS

INTRA-PLANT CARS

DESIGNED AND ENGINEERED
FOR YOUR SPECIFIC NEEDS

20 TON

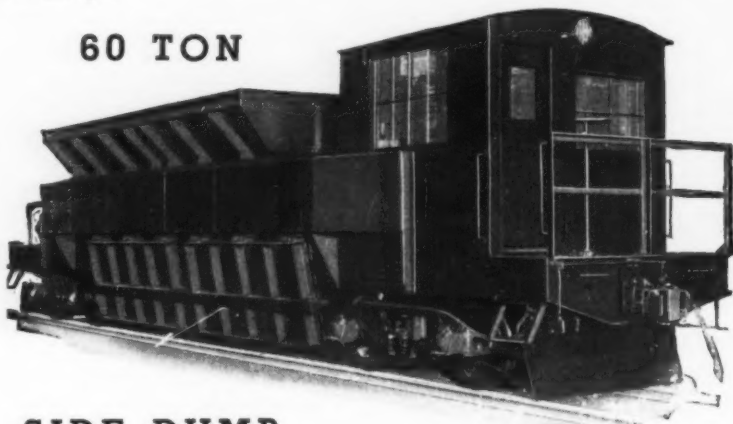
SCALE CAR



DOUBLE HOPPER
BOTTOM DUMP

Car has Atlas underslung suspension scales with Atlas 24" Scale Dial with chart recording. Air brakes and air-operated discharge gates. Cast steel side-frame trucks with Roller Bearings.

60 TON



SIDE DUMP
ORE TRANSFER CAR

900 cu. ft. capacity, two-section hopper with electric heaters. Each section has independently-operated discharge gates. Car is equipped with air brakes, automatic couplers, headlights and whistle. Each truck mounts one 75-HP motor.

Atlas Engineering Service is always at your service.



THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS
1142 IVANHOE RD. CLEVELAND 10, OHIO U.S.A.

IRON AGE INTRODUCES

Continued

Harry J. Deines has been named manager of advertising and sales promotion for WESTINGHOUSE ELECTRIC CORP., Pittsburgh. Prior to joining Westinghouse Mr. Deines was account executive and vice-president of the Fuller & Smith & Ross, Inc., Cleveland advertising agency.



C. J. GERKER, sales manager, Midway Tool Co., Inc.

C. J. Gerker has been elected sales manager of the MIDWAY TOOL CO. INC., Melvin, Ohio. Prior to his affiliation with Midway, Mr. Gerker was associated with the George Worthington Co.

OBITUARIES

Irving J. Morris, 85, retired treasurer of the former Ludlum Steel Co., in Washington, died Oct. 18.

Charles S. Traer, 59, chairman of Acme Steel Co., Chicago, died Oct. 25.

Clifford D. Woodward, 71, chief engineer for the Anaconda Copper Mining Co., New York, died Oct. 26.

F. A. Wickerham, 66, assistant to the vice-president of research and technology, Carnegie-Illinois Steel Corp., Pittsburgh, died Oct. 27.

Al Jennings, 54, vice-president of the Cleveland Worm and Gear Co., Cleveland, and of its associate company, The Farval Corp., died Oct. 30.

Resume Your Reading on Page 24



IMMEDIATE DELIVERY

MACCO QUALITY STEELS

You pay no more for MACCO QUALITY STEELS tailor made and closely inspected by our qualified metallurgical staff. You obtain immediate and friendly service. Our company has specialized for seventy-five years in producing the finest quality steels in the world.

MACCO SUPERIOR 18-4-1 HIGH SPEED TOOL STEEL
MACCO RADIO 6-6-4-2 HIGH SPEED TOOL STEEL
MACCO ENORMOUS HIGH SPEED COBALT ALLOYED TOOL BITS,
HARDENED, TEMPERED AND GROUND ALL OVER, READY FOR USE
MACCO KROMAX HIGH CARBON HIGH CHROME TOOL STEELS
MACCO ROYAL CROWN OIL HARDENING TOOL STEEL
MACCO 35 AIR HARDENING TOOL STEEL
MACCO SPECIAL STRAIGHT CARBON TOOL STEEL

MACCO FOOL PROOF ALLOY CHISEL STEEL
MACCO ROYAL CROWN OIL HARDENING HOLLOBAR TOOL STEEL TUBING
MACCALLOY HOT ROLLED AND COLD DRAWN ALLOYS OF ALL ANALYSES
MACCO CERTIFIED BLUE AND BRIGHT TEMPERED AND POLISHED SPRING STEEL
MACCO COLD ROLLED ANNEALED SPRING STEELS IN
COILS, STRIPS AND SHEETS C1095 AND C1075 ANALYSES
MACCO GENUINE SWEDISH (NORWAY) IRON
MACCO SPRING WIRES — OIL TEMPERED AND ANNEALED
MACCO STAINLESS COLD ROLLED STRIP AND COLD DRAWN WIRE

IRON AND STEEL MILLS
SINCE 1874

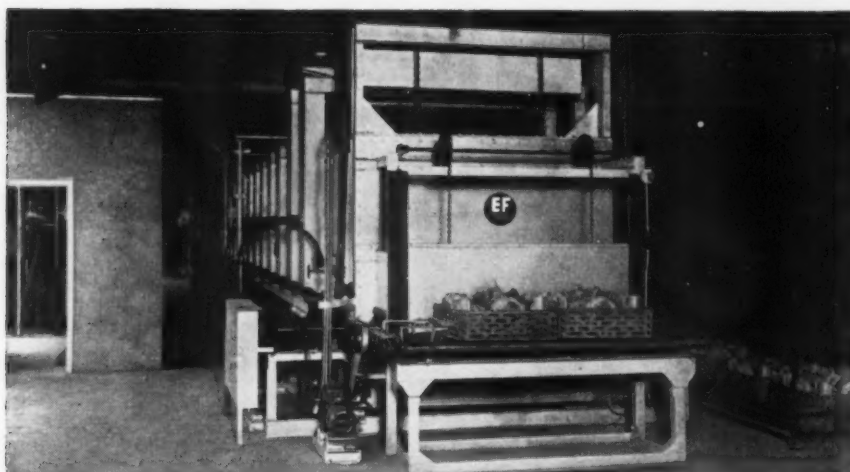
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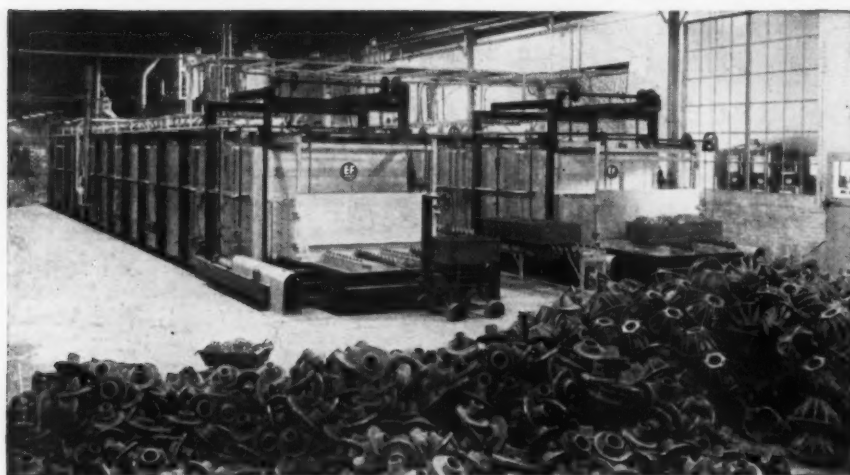
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17 KING TERMINAL
BOSTON 27, MASS.

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EF MALLEABLE FURNACES



SHORTEN THE CYCLE



FROM DAYS TO HOURS

● EF special atmosphere short cycle malleablizing furnaces produce a better, more uniform and scale-free anneal—in shorter time—at lower cost. They reduce the amount of material tied up in process—speed deliveries. Packing in pots is entirely eliminated, reducing the fuel requirement—the labor cost—and improving working conditions in the plant. Continuous types like those pictured above, or batch type furnaces, fitted with gantry cranes or other material handling equipment if needed to facilitate the handling of large, heavy castings. Radiant tube gas-fired, oil-fired or electrically heated, to use the fuel available or best suited to your specific requirement.

We build furnaces for every foundry annealing and heat treating requirement. Let the EF engineers work with you on your next job.



THE ELECTRIC FURNACE CO.
GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
FOR ANY PROCESS, PRODUCT OR PRODUCTION
Salem - Ohio

FREE

PUBLICATIONS

Continued from Page 34

and diesel engines. *Thermo Electric Co.* For more information, check No. 11 on the postcard on p. 35.

Production Facilities

Equipment for deep hole drilling and finish grinding of connecting rods, milling of large castings, heavy duty turret lathe machining, and other modern production methods are described in 4-p. bulletin. *Carey Machine Co.* For more information, check No. 12 on the postcard on p. 35.

Air Control Valves

Photos, cross-sections, and specifications are contained in pamphlet on ten types of air control valves. *Valvair Corp.* For more information, check No. 13 on the postcard on p. 35.

Multi-Stage Turbine

The economic generation of electric power by multi-stage turbines in plants where steam is required for heating or processing is described in profusely illustrated 24-p. booklet. *De Laval Steam Turbine Co.* For more information, check No. 14 on the postcard on p. 35.

Drilling Units

Brochure describes new drilling and tapping units that incorporate a simple centrifugal feeding device with full hydraulic control. Exterior adjustments provide control of rate of feed and length of stroke. *Grove-Nelson Co.* For more information, check No. 15 on the postcard on p. 35.

Floor Truck

The 915-lb Truck-Man floor truck that turns in its own length while carrying a 2000-lb load is illustrated and described in 6-p. pam-

Can you use

93% PROVABLE BUYING POWER COVERAGE of the metalworking market?

No guesswork! No estimates! Actual circulation count proves The Iron Age now reaches plants representing 93% of the metalworking industry's entire buying power.

IRON AGE COVERAGE OF BUYING POWER

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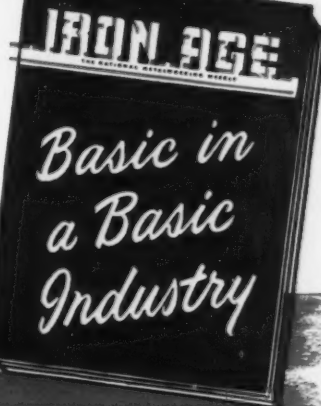
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Machinery (Except Electrical)	1,335,822	1,246,059	93%
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Transportation Equipment	1,230,064	1,208,197	98%
Instruments, Clocks	162,457	154,347	95%
Misc. Metal Products	165,415	133,271	81%
TOTALS	5,691,658	5,296,524	93%

With circulation of 24,952 — highest of any metalworking weekly — The Iron Age today offers you the most complete coverage of buying power in its history. Ask your nearest Iron Age representative for all the facts and figures that prove this. Ask him, too, about Iron Age's new editorial format and write today for your copy of the revised edition of Iron Age's Basic Marketing Data which has just been released.

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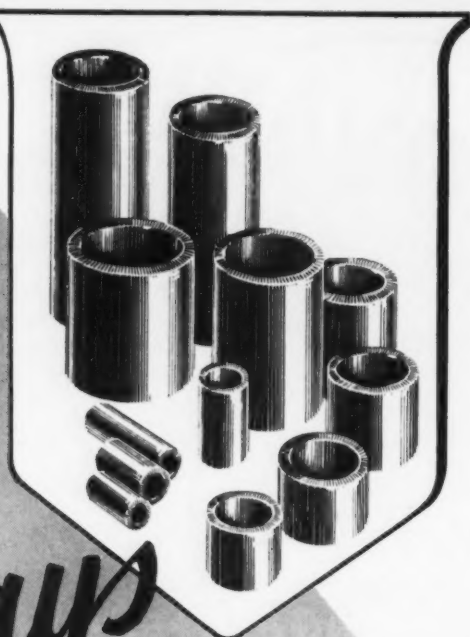
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SIZES**

Always

**JOHNSON
GP
BEARINGS**

**IN
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FOR the vast majority of sleeve bearing applications, these stock size Johnson GP (General Purpose) Bearings will meet your requirements. And they save you money, since they are produced in large quantities . . . no special machine set-ups . . . no pattern costs. Every one is completely machined to standard tolerances, ready for immediate installation. Write today for your copy of the Johnson Bronze Catalog.

If you do not have a Johnson Bronze Catalog of standard size sleeve bearings on your desk, we will be glad to send you one at once.

Write today!



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SLEEVE BEARING HEADQUARTERS
505 SOUTH MILL STREET • NEW CASTLE, PA.

FREE PUBLICATIONS

Continued

phlet. Two filler sheets describe pallet toter and platform utility truck, giving prices and specifications. *Truck-Man Div., Knickerbocker Co.* For more information, check No. 16 on the postcard on p. 35.

Portable Electric Hoists

Descriptions and illustrations of Budgit hoists are featured in 12-p. catalog that includes specification charts and prices. *Manning, Maxwell & Moore, Inc.* For more information, check No. 17 on the postcard on p. 35.

Material Handlers

Material handling equipment such as skid platforms, skid trailers, haulers, pry bars, and barrel skids are illustrated and described in 8-p. catalog. *Ironbound Box & Lumber Co.* For more information, check No. 18 on the postcard on p. 35.

Speed Reducers

Catalog 202 describes a line of single and double speed reduction units. Text contains photos, construction details, and torque charts. *Euclid Universal Machine, Inc.* For more information, check No. 19 on the postcard on p. 35.

Sewage Filter

Thru-Clean bar screen for removing large solids from water under treatment is described in illustrated folder No. 2327. *Link-Belt Co.* For more information, check No. 20 on the postcard on p. 35.

Electric Heating Units

Chromalox electric heating units including finstrip, oven air blast, ring cartridge, tubular heaters and approx 15 other types are described in 50-p. catalog. Photos, details, specification charts, price lists and discounts are included. *Edwin L. Wiegand Co.* For more information, check No. 21 on the postcard on p. 35.

Resume Your Reading on Page 35



Here's the Outstanding DC Arc-Welder
Development of All Time

The *New* P&H NEMA-Rated Model WFA 300

(Welding Service Range 60-375 amps)

The only DC Welder with time- and money-saving Dial-lectric control — a compact, light-weight unit that runs at the life-preserving speed of 1750 rpm.

Here's a DC welder that can reduce your welding costs . . . P&H's new model WFA 300.

Just check these features:

 **LIFETIME SEALED BEARINGS**
— no lubrication needed.


 **1-BUTTON START AND STOP SWITCH**
— overload protection.


 **GLASS INSULATION**
— quality available.

 **COMPACT DESIGN**
— takes little or no floor space.


 **DUAL-FAN COOLING SYSTEM**
— the coolest welder you have ever seen.


 **STATIONARY OR PORTABLE MOUNTINGS.**


 **LOWEST RPM PER POUND OF WEIGHT**


 **QUIET** — you hardly know it's running.

 **DIAL-LECTRIC CONTINUOUS CONTROL**

 **REMOTE CONTROL** — full arc control at the work.

 **HIGH-LOW RANGE** — requires only a flip of a switch.

 **POLARITY SWITCH** — an extra feature at no extra cost.

 **GREATER MOBILITY**
— only 695 lbs.



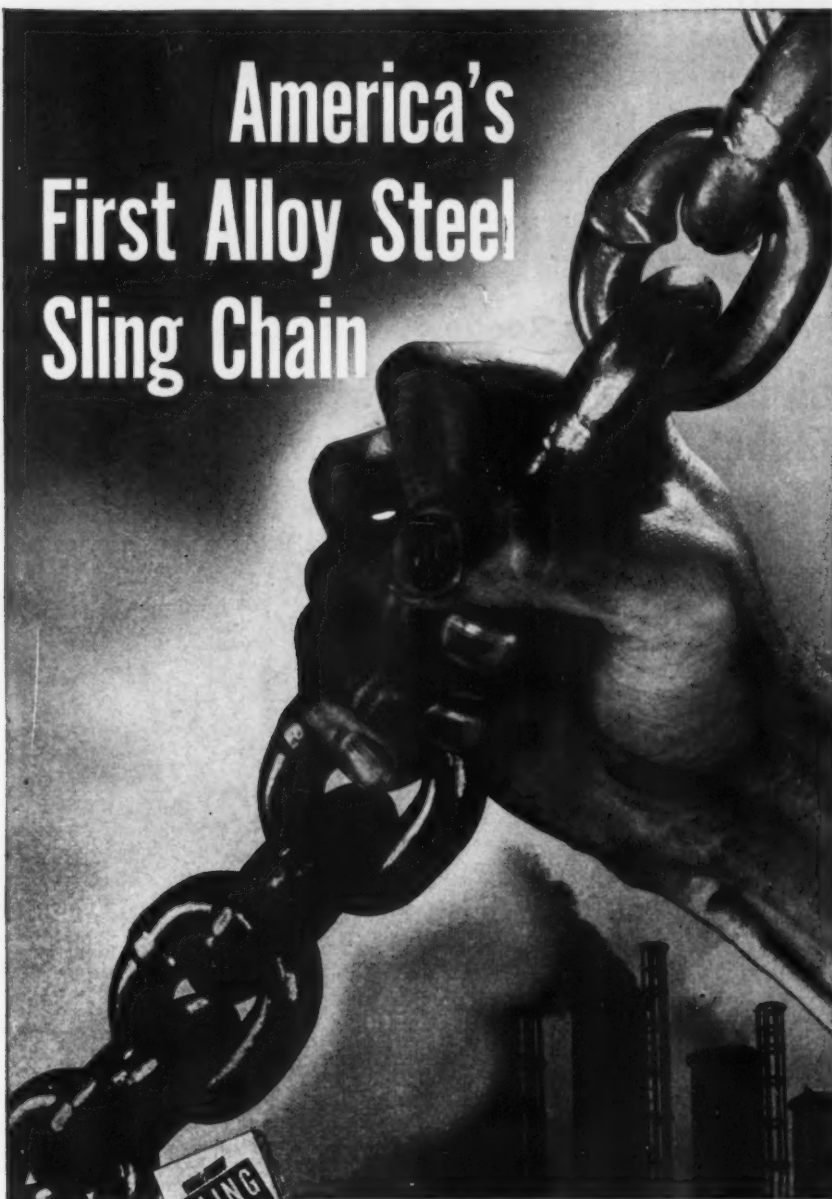
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Get all the facts about this new, outstanding DC Welder.
Call your P&H representative or write us for Bulletin W-80.

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WELDING ELECTRODES • MOTORS • HOISTS • ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

CM HERC-ALLOY

America's First Alloy Steel Sling Chain



Write for your copy of this new,
informative booklet. No charge.

COLUMBUS-McKINNON CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corporation)

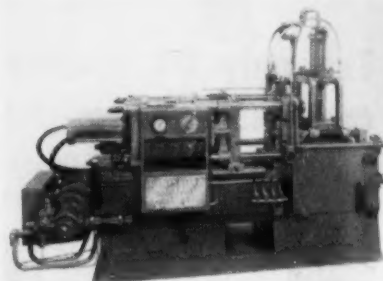
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NEW

PRODUCTION IDEAS

Continued from Page 38

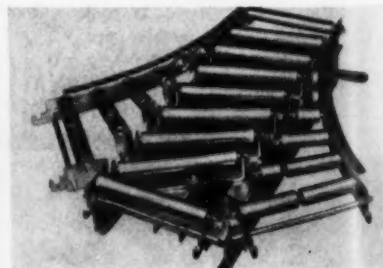
stage pump driven by a 10 hp direct connected motor. The pump delivers 43 gpm at the low pressure stage and 10½ gpm at the high pressure or 500 psi stage. The machine can be furnished as a cold chamber unit for casting aluminum



or as a gooseneck type for casting zinc, tin, or lead. Automatic or manual controls can be supplied. Die plates are 22 x 18 in. and four tie bars have 2 in. diam. The space between tie bars is 16 x 12 in. and die opening is 8 in. An estimated 50 tons locking pressure is obtained through a toggle mechanism. Aluminum castings up to 2½ lb and zinc castings up to 4 lb can be produced on the machine. Free cycle time is said to be over 1000 shots per hr. *Cleveland Automatic Machine Co. For more information, check No. 33 on the postcard on p. 35.*

Conveyor Switch

A new conveyor switch provides straight-through, left, or right travel of commodities from a main line.



on standard Litewate roller or wheel conveyors. It consists of pivoted straight rollers, forming

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AGE



Defects in Connecting Rod Forgings shown under Black Light

Fast, Accurate Inspection Plus Doubled Savings!

These are the immediate results achieved by one of the major automotive plants using Magnaglo* for inspection of connecting rod forgings. Here's the complete story:

FORMERLY—Connecting rod forgings were cleaned by pickling, then visually inspected. Cost per thousand was \$7.50 for cleaning and inspection.

TODAY—Forgings are cleaned by shot blasting, then inspected with Magnaglo under black light, using less man hours with semi-automatic Magnaflux production units. Cost is now \$6 per thousand.

Faster inspection at lower cost . . . yes; and still more important is the far greater accuracy of Magnaglo. With visual inspection this plant saved \$100 per day in machining time by eliminating defective forgings in the rough state. With Magnaglo, savings are \$200 per day because twice as many defective forgings are spotted *before* machining.

Production officials of this plant give full approval to Magnaflux for improved quality control at production line speed that really "pays off". Magnaflux non-destructive inspection can achieve similar savings for you—write today for full particulars.

* Magnaflux, Magnaglo, trademarks of Magnaflux Corporation applied to equipment and materials for use with magnetic particle and fluorescent magnetic particle inspection methods.



M A G N A F L U X C O R P O R A T I O N
5702 Northwest Highway, Chicago 31, Illinois
NEW YORK • DALLAS • DETROIT • CLEVELAND • LOS ANGELES
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November 10, 1949

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HOW YOU SAVE, Getting Drier Compressed Air

● Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

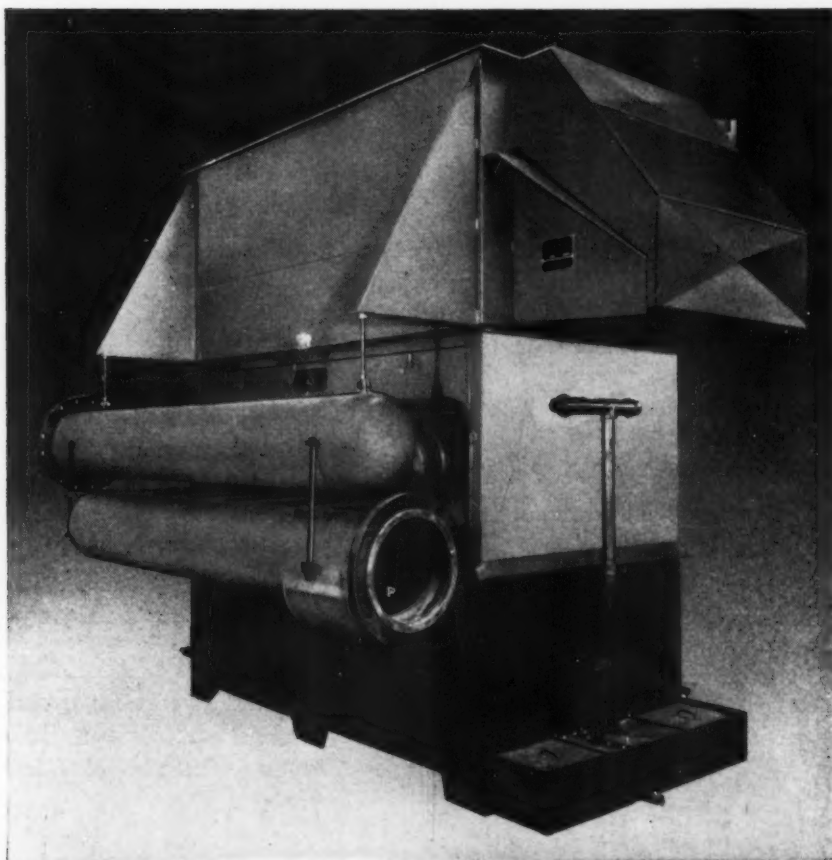
Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

Write for complete information; ask for Bulletin No. 98 .

NIAGARA BLOWER COMPANY

*Over 35 Years of Service in Industrial Air Engineering
Dept. IA, 405 Lexington Ave., New York 17, N. Y.
District Engineers in Principal Cities*



INDUSTRIAL COOLING  HEATING • DRYING
NIAGARA
HUMIDIFYING • AIR ENGINEERING EQUIPMENT

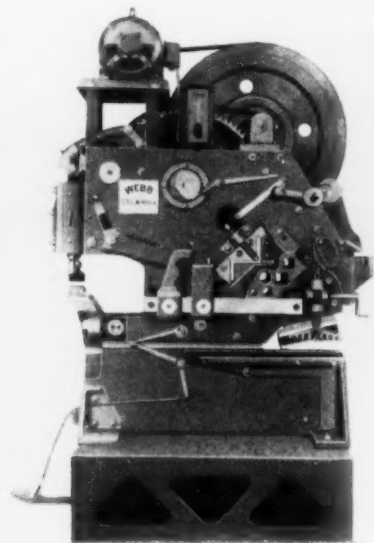
PRODUCTION IDEAS

Continued

the central or main line, that can be manually turned to the left or right. The pivoted rollers are controlled by a hand lever extending on either side of the switch. When turned for deflecting to either side, rollers always remain in true radial position. The switch is complete with 45° curve spurs on both sides. *Standard Conveyor Co. For more information, check No. 34 on the postcard on p. 35.*

Punch-Shear-Coper

A combination punch, shear and coper, known as the Steelworker, for use in structural and maintenance shops, is of uni-steel construction with steel plate fitted together and machined throughout.



The punch is at one end and on the opposite end, a section cutter for cutting angles, T's, Z's and straight cutting of round and square bars. A shear is provided for the shearing of 1/2-in. plate, and attachments are available for coping I beams and channels or for notching angles. The compact machine is powered with a 3 hp motor. *Webb Corp. For more information, check No. 35 on the postcard on p. 35.*

Battery Charger

A new universal charger for charging industrial truck batteries consists of a separately excited motor generator set with a no-load

How competitive can things be?



Today, for your choice of product you could go to any one of—

- 10 manufacturers of passenger automobiles.
- 35 manufacturers of standard household electric refrigerators.
- 12 manufacturers of television receivers.
- 26 manufacturers of table silverware.
- 28 manufacturers of typewriters.

These are fields considered highly competitive.

Imagine, then—

247 different steel companies make the steel products we depend upon in our daily living. Typical of these products are automobile sheets, nails, pipe, wire. There may be as many as 30 or 40 producers of any one of these products. The steel buyer has a wide choice in placing his order.

Competition leads to finer quality steel output every year—and it keeps prices lower than those of all other metals.

Steel's fair-paid employees, steel's stockholders—and steel's many competing companies—together serve the vital needs of America's demands for steel.

Steel works for EVERYONE

AMERICAN IRON AND STEEL INSTITUTE • 350 FIFTH AVENUE, NEW YORK 1, N. Y.

November 10, 1949

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2 Engines are Better than 1

**This NEW
Vegetable Harvester
Is Powered by
2 WISCONSIN
Heavy-Duty Air-Cooled
ENGINES!**



Harvesting onions and other vegetables mechanically is a NEW idea for a NEW machine . . . The Dilts-Wetzel (Ithaca, Mich.) Vegetable Harvester, powered by TWO Wisconsin Heavy-Duty Air-Cooled Engines . . . one driving the unit . . . the other powering the harvesting mechanism.

Peak efficiency and flexibility are always delivered, because the harvesting engine operates at uniform speed, regardless of the forward travel speed, and it shuts down entirely when moving to new locations. Furthermore, TWO Wisconsin Engines weigh less, cost less, use less fuel, and have lower part replacement costs than one large engine of comparable total horsepower.

Perhaps this offers an idea that can be advantageously applied to your equipment — for greater power, flexibility, efficiency, and economy. Your investigation is invited.

2 to 30 hp., single-cylinder, two-cylinder, and V-type four-cylinder models.

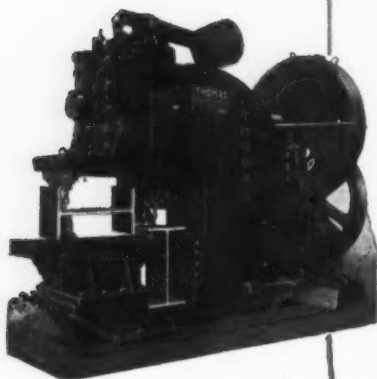


WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

BEAM PUNCHING

without tool change



The NEW Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

THOMAS
MACHINE MANUFACTURING COMPANY

PITTSBURGH (23), PA.

Write

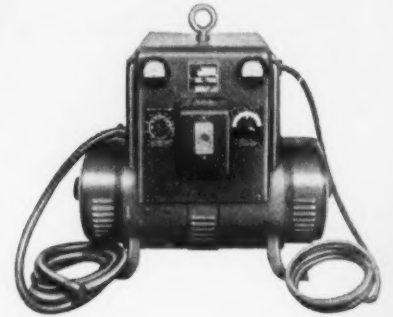
for detailed information

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

PRODUCTION IDEAS

Continued

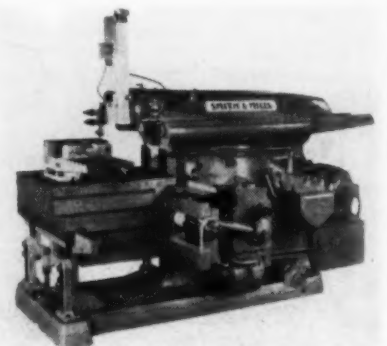
voltage control of 30 to 60 v, plus a voltage-drop control. The no-load voltage control is calibrated for the different cell combinations of the batteries. The charger is designed to charge 200 to 500 amp-hr lead-



acid batteries of 12, 15, 16 and 18 cell capacity, and/or 150 to 450 amp-hr nickel-iron batteries of 20, 24 and 30 cell capacity. The charge proceeds until the timer, set to the hour rating, reaches zero position, at which time the battery is automatically disconnected from the charger, and the unit shuts down. *Motor Generator Corp. For more information, check No. 36 on the postcard on p. 35.*

Shaper

Thirty-two and 36-in. shapers have been designed for use in production and railroad shops where there is a need for shaping large castings. Greater capacity under



the ram is obtained by a drop table that increases cross table travel; the table has been widened. For standard work, a table filler block is mounted on the drop table. Time saving features include horizontal and vertical power rapid traverse

**THIS KAYDON BULLETIN
CONTAINS DATA ON
DEEP-FLAME-HARDENING
AS PIONEERED BY KAYDON**

Write for this Bulletin now!



Special Bearings of Unusual Design

Problems of vibration and bearing stresses and specialized machinery operations KAYDON recognized the prime importance of weight reduction in the design of large bearings required. KAYDON has provided the means of bearing in the space available, and eliminated most of the surrounding parts which normally would be necessary. Important weight reduction results.

None of these unusual KAYDON designs have been drilled and tapped in the race . . . none also have

been drilled, cut or cut out. For these unusual designs, large races and housings, these sections KAYDON has hardened only the raceways, thus permitting the races themselves to be drilled, tapped and gear-cut . . . which could not be done if the race were through-hardened.

The technique of flame hardening bearings was a "patented" design process. For these special bearing loads are generated by KAYDON. For unusually large, lightweight, thin section bearings contact KAYDON of Muskegon.

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.
All types of Ball and Roller Bearings 4" bore to 120" outside diameter.

The KAYDON technique of deep-flame-hardening for bearings of unusual shapes, sizes and thin sections

Designers and users of special machinery will appreciate this information on KAYDON-pioneered deep-flame-hardening which has helped remove bearing-limitations that heretofore proved to be serious handicaps.

This new KAYDON technique in deep-flame-hardening hardens only the raceways of the bearings. This permits the races themselves to be accurately drilled, tapped and gear-cut . . . eliminates many of the surrounding parts which normally

would be necessary . . . results in important weight-reduction . . . makes possible the creation of unusual designs that accommodate minimum sizes of bearings in the space available . . . permits unusual shapes, very large diameters, and extremely thin sections, all of which greatly facilitate mounting.

Write for this Bulletin on KAYDON Deep-Flame-Hardening . . . and when you need the unique services offered, contact KAYDON of Muskegon.

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.
KAYDON Types of Standard or Special Bearings: Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust

ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

November 10, 1949

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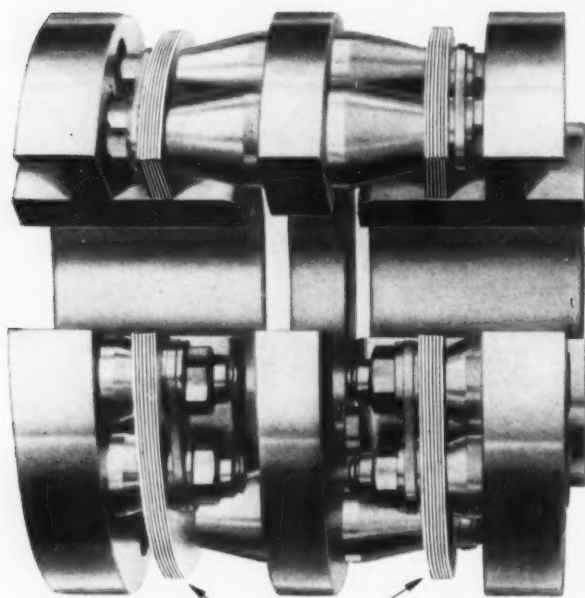
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: $\frac{1}{2}$ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

**BACKLASH
FRICTION
WEAR and
CROSS-PULL**
are eliminated
LUBRICATION IS
NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES
PERFECT BALANCE UNDER ALL
CONDITIONS OF MISALIGNMENT.

• • •
NO MAINTENANCE PROBLEMS.

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ALL PARTS ARE
SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

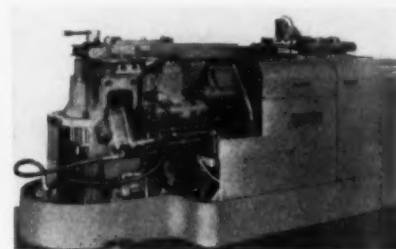
PRODUCTION IDEAS

Continued

to the table, automatic tool lifter, and automatic vertical feed to the tool. The 32-in. model illustrated shapes the top and recesses both ends of a large semi-steel casting with one setup. It has a maximum clearance under the ram of $26\frac{1}{2}$ in., maximum table travel 40 in., table width 30 in. *Smith & Mills, Inc.* For more information, check No. 37 on the postcard on p. 35.

Tube Bender

New high speed hydraulic automatic universal tube and miscellaneous bending machines are manufactured in sizes for bending up



to 3-in. OD $\frac{1}{4}$ in. wall or larger die tubes of the same area. Standard machines are equipped with 6 automatic stops for various degrees of bends, and are indexed automatically. They bend either right or left hand with the standard dies and can be furnished with hand control and automatic mandrel ejector. Motor and oil tank are in the base. The bending head is cast steel, fitted with needle bearings and operated by rack and pinion. *Acme-Winter Corp.* For more information, check No. 38 on the postcard on p. 35.

Gear Checker

The new Gearmaster ten-thousandth reading micrometer and special spur gear charts give all measurements and characteristics in a gear in one setup, and in a single operation. The body of the instrument and extension bars for large gears are made of Invar-Nickel alloy steel that will expand in any operating temperature to which the instrument may be subjected. Gears may be checked on

Two Leaders of Industry

COMBINE SKILLS AND PRESENT

the **FOOTE BROS.—LOUIS ALLIS** **GEARMOTOR**

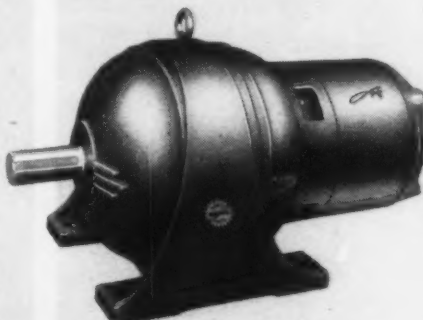
LOUIS ALLIS



THE LOUIS ALLIS COMPANY

Three generations of designing and building special motors for special applications by THE LOUIS ALLIS COMPANY—plus the creating, developing, and pioneering of many special types of motors for special operating conditions—give you one of—if not THE largest selection of sizes and types of standard and special motors in the entire industry today.

FOOTE BROS.



FOOTE BROS. GEAR AND MACHINE CORPORATION

Back of Foote Bros. is nearly a century of engineering knowledge and manufacturing experience plus the latest in gear generating equipment, all of which assure the highest quality in gear design and production. Foote Bros. complete line includes helical and worm drives to meet practically any industrial requirement.

The specialized engineering and manufacturing experience and facilities of FOOTE BROS. GEAR AND MACHINE CORPORATION and THE LOUIS ALLIS COMPANY are now available to industry through the separate sales, service, and manufacturing organizations of both Companies.

The combination of these two quality products into one compact, efficient gearmotor reflects the earnest desire of both firms to better serve industry through their combined skills.

To be available in single, double, and triple reduction in ratings of 1 h.p. through 75 h.p. with open drip-proof, enclosed, splashproof, and explosion-proof motors.



On your very next gearmotor application Specify Foote Bros.—Louis Allis Gearmotors

THE LOUIS ALLIS COMPANY

427 East Stewart Street
MILWAUKEE 7, WISCONSIN

For quick, dependable service—contact nearest Louis Allis or Foote Bros. Gear and Machine Corporation sales office—or write to the home office of either company.

FOOTE BROS. GEAR AND MACHINE CORPORATION

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PROFITS UP—COSTS DOWN on *Quality* STAINLESS STEEL

STEEL
ALLOY STEEL
ALUMINUM

END PRICE WORRIES

PRICES are still the main topic of conversation . . . FEAST OR FAMINE ON SALES . . . A low cost for production must be attained.

YOU can PROFIT . . . by our prompt delivery . . . prime material . . . savings effected on price.

If it's SHEET—STRIP—ROD—WIRE—TUBING—call on us for your requirements and rest assured—we'll do our level best—be it PRICE—DELIVERY—QUALITY.

Large stocks in principal cities

DEPENDABLE Sales 
CORPORATION

JOHNSON & GOLD STREETS
BROOKLYN 1, N. Y.

ACME *STRAIGHTLINE* AUTOMATICS

• CUT POLISHING
AND BUFFING
COSTS!

Horizontal return —
20 to 80 ft. long —
adjustable lathes—
one or both sides—
loaded or unloaded
either end or side

32 ft.—Six Head unit, loading table
at one end — unloading at oppo-
site end — loose fixtures return
to loading station by gravity
roller or power belt as shown.

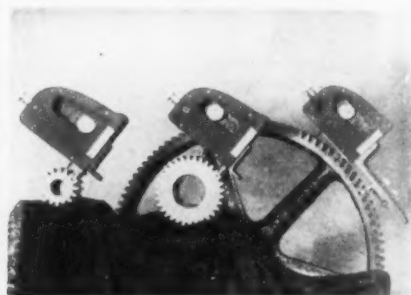


ACME Manufacturing Co.
1645 HOWARD ST. DETROIT 16, MICH.
Builders OF AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 35 YEARS

PRODUCTION IDEAS

Continued

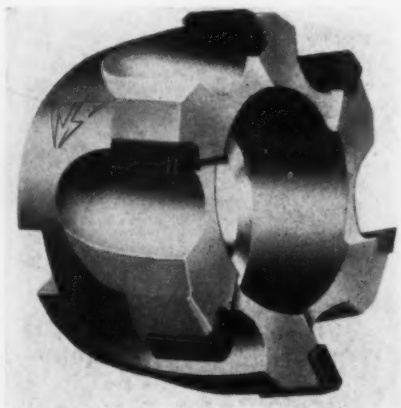
the assembled machine while they are hot from operating tests to compare measurements with those when the gears were cold. Micrometer readings determine chordal



measurement, tooth thickness, spacing, form and pressure angle, backlash allowance, diametral pitch, pitch diameter and possible mandrel run-out. *Urbauer Engineering Co.* For more information, check No. 39 on the postcard on p. 35.

Shell End Mill

For facing or milling to a shoulder, a new shell end-mill operates at higher feeds and speeds. It has more teeth in the cutters, allowing for greater table feed and freedom of cutting action. Sufficient flute capacity permits proper chip removal and a contour that creates correct chip formation. Heavy, well-balanced and stress-relieved



bodies of special, heat-treated alloy steel enhance rigidity and prevent vibration at high speeds. Sizes range from 1½ to 6 in. *Wendt-Sonis Co.* For more information, check No. 40 on the postcard on p. 35.

Resume Your Reading on Page 39

AC or DC?

The Job Determines the Type of Welder

By Burke Porter, Chief Engineer

C. O. Porter Machinery Company, Grand Rapids, Michigan



Burke Porter

Extensive changeover of our wood-working machines from castings to weldments has made advisable the construction of a new plant devoted entirely to the fabrication of our machine parts. In equipping this new welding shop, we have given considerable thought to the types of arc welders to be installed.

Should they be AC or DC?

The advice of the local Lincoln Welding Engineer seemed sound—install both types of welders and use the type which is best suited to each job.

Accordingly, we installed three 400-amp. Lincoln DC "Shield-Arcs" and two 500-amp. Lincoln AC "Fleetwelders."

For the bulk of our work, DC is preferable. Much of it involves outside corner welds, all-position joints, intermittent beads, light-gauge material, tubular members, and we often weld stainless steel.

On the other hand, in the welding of our bases, inside corner joints and boxed-in areas result in considerable arc blow. Under these conditions, we can use higher amperages and get faster welding and better quality with the AC welders.

In this problem of AC and DC welding, the unbiased recommendations of the Lincoln people are advantageous to us and our customers. It pays to apply the right type of welding to match the job.

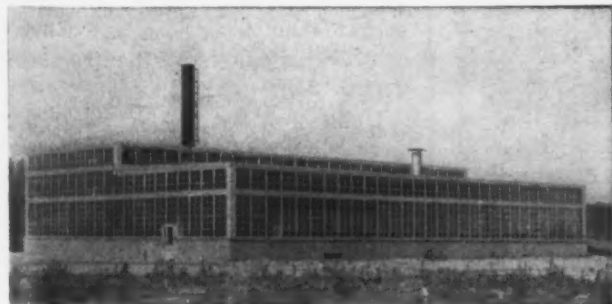


Fig. 1. New weldment plant of the Porter Machinery Co., evidence of the belief of this company in the superiority of welded steel for its products.

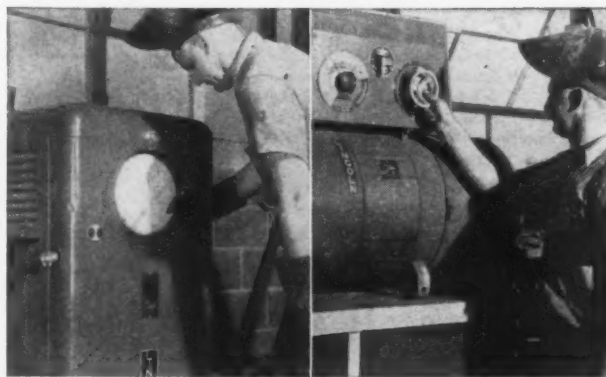


Fig. 2. (Left) If arc blow is involved, the welder tackles the job with AC. (Right) If arc blow or very high currents are not involved, DC usually is best.

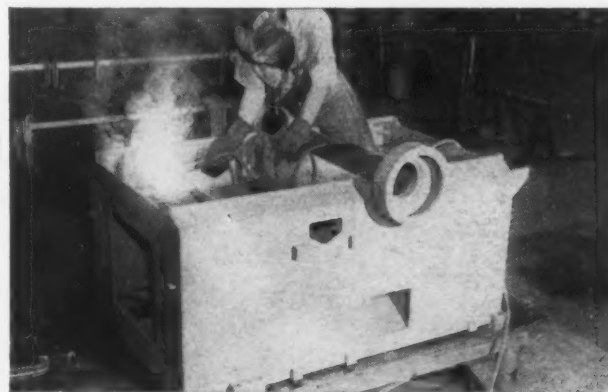


Fig. 3. Bases—where arc blow is severe—are welded with AC.



Fig. 4. Parts such as this frame are generally welded with DC.

The above is published by **THE LINCOLN ELECTRIC COMPANY** in the interests of progress.
Write for DC "Shield-Arc" Bul. 459 and AC "Fleetwelders" Bul. 366. The Lincoln Electric Company, Dept. 512, Cleveland 1, Ohio.

November 10, 1949

171

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THE KNURLED HEAD...

...performs Triple Duty!

UNBRAKO

**KNURLED SOCKET
HEAD CAP SCREW**

There is a definite saving of assembly time when you use "UNBRAKO" Socket Head Cap Screws with Knurled Heads. The exclusive knurled heads perform triple duty: (1) the knurling provides a sure, slipproof grip; (2) the knurling permits positive locking—a feature so often essential where there is excessive impact or vibration; (3) the knurling speeds assembly, because it enables the "UNBRAKO" to be screwed in faster and further with the fingers—handiest of all wrenches—before a "key" becomes necessary.

As always, the brand name "UNBRAKO" signifies extra strength and precision manufacture to close tolerances.

"UNBRAKO" Knurled Socket Head Cap Screws are available in both National Coarse and National Fine Thread Series, in a full range of standard sizes. Other sizes to special order. Write us for your free copy of the "UNBRAKO" Catalog and the name of your nearest "UNBRAKO" Distributor.

Other "UNBRAKO" Products include:

Socket Set Screws with Knurled Cup Points, Socket Set Screws with Knurled Threads, Square Head Set Screws with Knurled Cup Points—all patented Self-Locking screws that won't shake loose! Knurled Socket Head Stripper Bolts. Precision-Ground Dowel Pins. Fully-Formed Pressure Plugs.



Knurling of Socket Screws originated with "Unbrako" in 1934.

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STEEL AND WIRE COMPANY, INC.
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• News of Industry •

GIFS Releases '49 Directory

Cleveland—Gray Iron Founders' Society has released its 1949 directory of members, an 80-page book containing an alphabetical listing of 540 gray iron foundries in the U. S. and Hawaii.

Each firm's listing includes name, address, phone number, executive personnel, trademark, general types of castings produced, size and weight range of castings manufactured, operating capacity in terms of commercial demand, and type of foundry operation.

Information is also included showing firms having heat treating equipment, pattern and machine shop facilities.

Copies of the directory are available for purchase by non-member foundries at \$10.00 each, postage prepaid.

Business Profits Exaggerated

Washington—Claims that business profits are greater than ever are not substantiated by the Securities & Exchange Commission report for 1949 second quarter just made public.

Net income after taxes of all U. S. manufacturing corporations for the quarter, SEC said, is estimated at \$2 billion. This is 16 pct less than for the first quarter and 29 pct below profits of second quarter 1948.

Blaw-Knox's Earnings Rise

Pittsburgh — Blaw-Knox Co.'s earnings for the first 9 months of this year were \$2,780,381, or \$1.97 a share, compared with \$2,646,675, or \$1.88 per share, for the like 1948 period.

Unfilled orders as of Sept. 30 were \$24.8 million, compared with \$39 million at the start of the year.

National Supply's Net Drops

Pittsburgh — National Supply Co.'s net earnings for the first 9 months of 1949 were \$4,729,036 on sales of \$107,506,956. This compares with net income of \$7,094,467 on sales of \$108,303,184 for the corresponding period of 1948.

METAL CLEANING *News*

Profitable Ideas That Work with WHEELABRATOR Airless Blast Cleaning



BETTER RUBBER ADHESION AT LESS COST

A properly cleaned surface is the key to successful bonding of rubber to metal parts. At The Ohio Rubber Co., six Wheelabrators of various sizes and types provide complete facilities for the surface preparation of practically any metal part for rubber-to-metal adhesion. Adherence of rubber to the Wheelabrated metal is better, cheaper and more uniform than that obtained by the pickling and plating process formerly utilized.

Blasting Dies

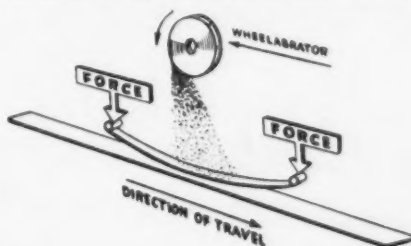
General Electric Co., DeKalb, Ill., discovered they were able to produce die castings with a matte finish by Wheelabrating the dies themselves. Processing time on die-cast motor end caps made of aluminum and zinc was slashed due to the elimination of the finishing operation.

The Wheelabrator® Method of Airless Blast Cleaning

"Wheelabrating" is a simple mechanical method of abrasive blasting in which abrasive is fed through a control cage to the center of the bladed "Wheelabrator" wheel which rotates at high speed. By centrifugal force the abrasive is thrown from the wheel, under perfect directional control, upon the product being cleaned or finished. For complete information write for Catalog 74-A.

Stress Peening

AMERICAN has now increased the effectiveness of the shot peening process by



the development of methods of peening while the parts are statically stressed in the same direction as the stress to be sustained in service.

A Sure Cure

When cutting tools break or dull quickly in machining improperly cleaned parts costs rise and valuable production time is lost. Increased tool life, decreased grinding time, and increased production are tangible benefits of Wheelabrator's fast, thorough cleaning action.



TRU-STEEL Shot

Perfect TRU-STEEL Shot has no equal for economy and performance. It is new and different — a genuine true steel that has received a full heat treatment, not just a draw or anneal.

Exclusive features: round and solid — hard and tough — fully heat treated — wears down, but does not break down — accurately graded and controlled as to quality and hardness.

Performance: (1) lasts many times longer than chilled iron shot; (2) cleans as fast, or faster, than chilled iron shot! (3) reduces machine maintenance costs; (4) increases life of machine parts; (5) saves storage space and transportation costs; (6) reduces cleaning cost per ton.

Write for Bulletin No. 59.

Eliminates Scratches in Deep Drawing

A serious problem in deep drawing steel is preventing the lubricant from being wiped off the slick surface of the work by the dies. Hunter Spring Co. solved this by Wheelabrating the blanks after the first draw. The resulting "orange peel" surface retains the lubricant eliminating the metal-to-metal contact that creates scratches.

Protecting America's Underground System

Advantages of Wheelabrating oil, gas, or water pipes prior to protective coating are:

1. Easier and more thorough inspection.
2. Increases the surface area for better bond.
3. Insures a thoroughly clean and moisture-free surface.

Tests on the effect of surface condition on the quality of bond produced show that if a grit-blasted surface is rated at 100%, sand-blasting is 70% to 80% efficient and wire brushing is 40% to 50% efficient.

For further information on this subject write for Industry Report No. 534.



Manufacturers of WHEELABRATOR®
Airless Abrasive Blast Equipment

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Radioactive Isotopes

Continued from Page 82

Laboratory coats and coveralls are washed periodically by a laundry aware of the circumstances. Active waste matter is reduced in volume by ashing under melting hoods and stored for disposal by burial when the Carnegie Institute of Technology cyclotron is completed. One burial pit will serve all departments.

In the period over which the regulations have operated, there have been no deviations in blood counts not ascribable to normal causes and no overdoses detected by film badges or ionization meters. One minor spillage occurred, and one melting crucible cracked in operation with an active melt. The latter froze before reaching the floor, and the former was easily cleaned up. No other contamination of the laboratory facilities has been observed, nor have any of the problems undertaken required continuous contact of any individual with

tracers. Such work is of an intermittent nature.

A few words may be in order concerning the number and qualifications of personnel and the investment in equipment needed to carry on tracer equipment. Some person must be in charge of the project who is scientifically qualified to supervise the experiments and is fully aware of the safety precautions that must be taken; this much is required by the Atomic Energy Commission before isotopes will be allocated. (It is not necessarily required that an experienced radiochemist or physicist be imported, because the special techniques can be learned fairly rapidly by competent technical personnel through special training courses.)

It has been found, from experience, that the attention of the experimental scientists conducting the work of primary interest should not be diverted too heavily to the problems of radiation counting and the maintenance of counting and monitoring equipment. This phase is supervised by a man trained in

physics, chemistry and electronics, assisted by electronics technicians who are able to keep the circuits in repair, construct or modify equipment and perform the routine counting.

Another requirement is that a competent analytical chemist be available and trained to handle radioactive analyses and separations. It will probably be necessary in most laboratories to have a mechanic instructed in radiation precautions to do simple machine work on or around active equipment. Thus, three to five people, occupied at least part of the time in service functions, may be necessary to support the efforts of half a dozen persons engaged in direct experiments utilizing tracers. The latter group may sometimes spend only a few hours a week in the actual handling of hot materials, the rest of their attention being given to setup time, preliminary runs and related work. It would not be desirable to have one person specialize in hot runs for an entire laboratory staff because he would run the risk of overexposure and of accidents arising from inadequate familiarity with the important details of many techniques.

It is evident from the size of the staff indicated that a substantial investment in equipment is unavoidable. A minimum initial installation of counting and monitoring equipment will cost about \$1500, and the investment can easily be doubled if any great volume of work is to be handled. To this must be added the cost of fume hoods, special working surfaces, shielding and remote handling equipment, if high-energy isotopes are to be used, protective clothing and airline masks and any modifications of space which may be necessary.

The intrinsic cost of isotopes is not exorbitant; typical irradiated units for metallurgical research will cost less than \$75 delivered.

The possibilities of using tracers in metallurgical industry have hardly been touched as yet. The opportunities should certainly be exploited, but one should always examine a project critically to be sure it is a proper application.

Resume Your Reading on Page 83

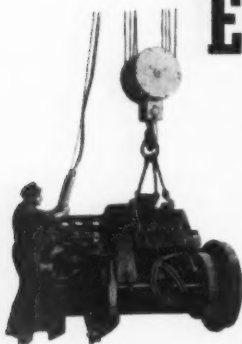
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OR FEET
WITH THIS
FLOOR

OPERATED

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Spot-Positioning thru ease of accurate control is an outstanding performance feature of this 25 ton crane equipped with *E C & M Frequency Relay Dynamic Lowering Control. Non-overhauling loads with empty or slightly loaded hook start down slowly since weak "down power" is permissible. Euclid builds cranes in a range of styles and capacities to meet varied requirements.

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research, engineering and production
skills is the result of group action.*



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Write to Dept. D-6

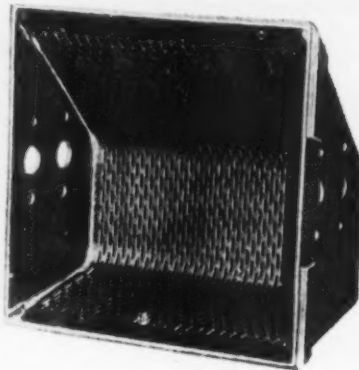


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Typical of Hendrick's Manufacturing Facilities



Hendrick is exceptionally well equipped to manufacture to specifications a wide range of metal products that involve such operations as perforating, shaping, forming, welding, brazing, riveting, etc. The

perforated elevator bucket illustrated is typical of the many specialized articles for whose fabrication Hendrick has unusual facilities. Write in detail regarding any metal product you desire fabricated.



Perforated Metals
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Architectural Grilles
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"Shur-Site" Treads and
Armorgrids

HENDRICK

Manufacturing Company

37 DUNDAFF STREET, CARBONDALE, PENNA.

Sales Offices In Principal Cities

FATIGUE CRACKS

Continued from Page 20

Fact Book

The Reader Service Department, as hundreds of inquisitive readers have gone to the trouble of finding out, is probably the squirreliest crew in the entire metals industry. This is not a masochistic quip but simply a reference to the R.S.D.'s ingrained habit of storing away every possible acorn of information it can scurry away with.

This comes in mighty handy, for our favorite family has a boundless appetite for facts and figures. The brains department, from its perch down the hall, long has marvelled at the crowd supping at the R.S.D. board. In fact, from the brains department branches have come most of the acorns.

Like any short-order meal service, this spasmodic feeding has its drawbacks. For every reader that asks, there probably are scores that spend time unnecessarily grubbing up their own fare.

Come Jan. 5, next, the larder doors will be thrown wide open. In one big bulging issue, running close to 400 pages, will be served up all the facts and data so laboriously collected. The traditional Annual Issue will become a Fact Book Issue, as cozy to curl up with as the World Almanac—except that all of the material will be confined to the metals industries.

You can sup 'til they ooze out your pores on facts and figures on production, prices, wages, labor productivity and a bouillabaisse of related information. Not content with the store of vittles on hand, every mother's son in the brains department has been rustling around the neighborhood to gather more. The government, trade associations, and technical societies have been tapped. Your f.f.j.'s Research Division has been milked for original research material available nowhere else.

To provide a balanced diet, the Fact Book will be seasoned with data on all branches of the industry—metal producing, stamping, forming, forging, casting, powder metallurgy, heat treating, welding and joining, machining, tools, fasteners, nonferrous metals, safety, labor, material handling, power transmission, metal finishing, testing and inspection, raw materials, and a list that would fill this page.

The Fact Book issue will go automatically to all subscribers, one copy to a customer. If you need additional copies, the cover charge is \$2. Better order now, though, because the chef puts his foot down on too many extra guests for dinner.

Resume Your Reading on Page 21



Welded Steel
FABRICATION

Mill Drive Case and Cover. Case,
20' x 9' x 8'8". Cover, 17'6" x 6'7" x 5'.

FROM 60,000 POUNDS

TO 600 POUNDS



End Housing for a Diesel Engine.
Stress relieved. 4' x 3'.

**NO WELDMENT TOO LARGE
OR TOO SMALL**

*for economical design and
fabrication by GRAVER*

Size—large or small—is no limitation to Graver designers and welders in the fabrication of welded steel structures. They have at their disposal years of experience and complete shop facilities . . . a necessity if the advantages inherent in welded fabrication are to be exploited to their fullest extent in the finished product. Graver weldments are built either to your own drawings and specifications or to designs developed by the Graver Engineering Department. All machining operations are available to carry each job to the point of greatest economy for the purchaser. For quotations or assistance in design work, write or wire today.



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GRAVER TANK & MFG. CO., INC.

EAST CHICAGO, INDIANA

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November 10, 1949

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CrysCoat

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surfaces for painting,
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OAKITE CrysCoat*
PROCESS!

YES, painting and finishing superintendents and foremen, process and product engineers, job paint shop-owners, chemists and metallurgists everywhere, are saying good things about the OAKITE CrysCoat PROCESS. They have found that it:

- cleans metal surfaces and conditions them for painting
- improves the adhesion of paint to metal
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and does all these things with minimum equipment . . . in minimum time . . . at minimum cost

FREE Write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y., for illustrated folder F7642 which describes the OAKITE CrysCoat PROCESS and tells how it *cuts cost 10 ways* in preparing metal for painting.

*Reg. U. S. Pat. Off.

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Technical Service Representatives Located in
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—Dear Editor . . .

Letters From Our Readers

PUBLIC WORKS PLANNING

In *Newsfront* of the Sept. 29 issue, the second item reads: "Government officials are quietly urging local authorities to step up public works planning, feeling that private financing will be unable to hold 1950 construction at the levels attained during the last 2 years. Only sharply increased public building is holding the line this year in an industry that directly employs 3 pct of the work force."

If this statement were translated into its true meaning, it would read like this: "Government officials are quietly urging local authorities to see if they can not have enough public works plans ready before the 1950 campaign so that the incumbent party will be assured of a return to power through votes acquired by offering patronage to an industry that directly employs 3 pct of the work force."

Let's just face it. Votes are being bought, not by paying an honest dollar for a dishonest vote, but by promising illusory returns from ill-advised projects (such as Passamaquoddy) to the gullible but honest, profits to the contractors, wages to the workers, and general prosperity to us all, "God bless us." We are not to notice, of course, that all these benefits will be paid for out of the wages paid to the workers, the profits that the contractors receive, and from the earnings of the gullible but honest, who also pay taxes. Let's start a movement to raise hob every time a fool public works program is proposed, and let our neighbors know that we feel vote buying by promise of a cut from treasury funds, or of illusory benefits, is rather less honest than paying cash for votes.

F. W. TURNBULL

Vienna, Va.

NEW FORMAT

I want to tell you that THE IRON AGE has been improved by the changes you made several months ago. It will now be easier for those who do not regularly read your magazine to pick the most interesting parts. Personally, I always liked the old IRON AGE. I had a certain routine for reading it, but the new edition is really more tempting.

A. O. SCHMIDT
Research Engineer

Kearny and Trecker Corp.
Milwaukee

SPRAY PAINTING

We have received the six sets of tear sheets on the article "A Control System for Spray Painting," as requested in our letter of May 26. We want to express our appreciation not only for the tear sheets but also for the promptness with which you handled our request.

A. C. VICK

Divisional Engineer

U. S. Steel Products Co.
Sharon, Pa.

COKE CONSUMPTION

Have seen the article "Reducing Coke Consumption in Iron and Steel Production" in the July 14 issue and would appreciate it if you would send me a set of tear sheets.

GEORGE W. FREELAND

Chief Consulting Engineer

Kaiser Engineers, Inc.
Oakland, Cal.

STAINLESS STEEL

Will you kindly send me tear sheets of the article "Influence of Lead in Behavior of Stainless Steel" which was published in the July 14 issue.

E. H. FORSSTROM

Asst. Plant Manager

Allegheny Ludlum Steel Corp.
Watervliet, N. Y.

PLATING WASTE

If it is possible, we would appreciate receiving a copy of the article by Jerome L. Bleiweis entitled "Plating Waste Disposal," which appeared in the June 16 issue.

JOHN J. WILLIAMS

Plant Manager

Talon, Inc.
Meadville, Pa.

EXTRUSION

A customer of ours, here in Germany, would like to obtain a copy of the article "High Speed Photos Reveal Extrusion Rate Phenomenon," which appeared in the issue of Dec. 2, 1948.

MENGELE, HARBEKE

Foreign Dept.

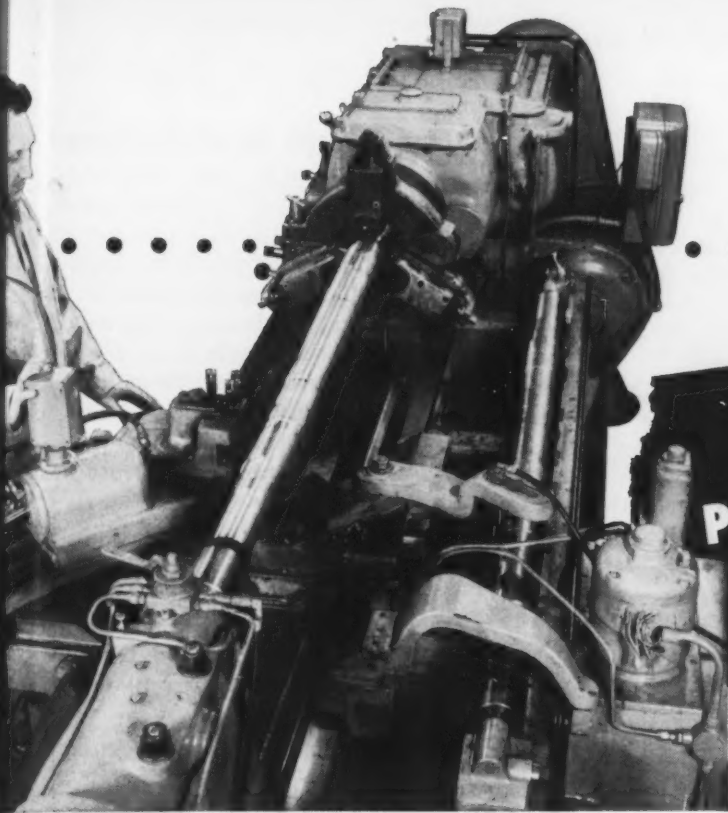
Carl Gabler GMBH
Munich, Germany

HOT MILLING

We would appreciate receiving several copies of the article "Hot Milling, Milling High Strength Alloys at Elevated Temperatures."

R. L. ROLLINGS

Lloyd & Arms, Inc.
Philadelphia



... *You* ...

**CAN BE IN THIS
PROFIT PICTURE—WITH
AIR-GAGE TRACING**

Size—shape—quantity; you can't stump the Monarch "Air-Gage Tracer" on any of these.

Here's why it's tops among tracer-controlled lathes when it comes to versatility.

The "Air-Gage Tracer" is:

- 1—Applicable to all sizes of Monarch Lathes, from the 10" to the 32".
- 2—Able to employ either a flat or a round template.

3—Adaptable for use on any length machine. The Type C (illustrated above) is recommended particularly for extra long work.

4—Equally proficient for contour turning, boring and facing—and for multiple diameter work, including step shafts.

5—Available in conjunction with variable feed and rapid traverse return as a Packaged Unit, which provides a completely automatic cycle as a further boost to production.

The results shown for the job illustrated are typical of what you can expect with an "Air-Gage Tracer". May we show you how this faster, better method of tracer-controlled machining fits into *your* profit picture?

JOB FACTS

Part—SAE 1045 shaft

Size— $70\frac{11}{16} \times 4\frac{1}{2}$ Max. Diam.

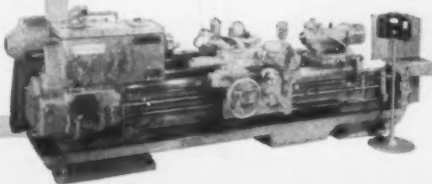
Tolerance— $+.000'' - .002''$

Operations—Turn complete. (16 Diams. & 4 Chamfers)

Feed— $5''/\text{min.}$ on diameters to be ground; $2''/\text{min.}$ on all others

Machine—20" Monarch Model M Engine Lathe with "Air-Gage Tracer" Packaged Unit

Machining Time—26.01 Minutes



The MONARCH MACHINE TOOL Company
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FOR A GOOD TURN FASTER — TURN TO MONARCH

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Big Business Given 73 Pct Of All Defense Dept. Contracts

Washington—Congressional opponents of big business are disturbed over the fact that the Defense Dept. let only 27 pct of its \$5.5 billion procurement program in fiscal 1949 to small business.

Representative Celler, D., N. Y., chairman of a House subcommittee to investigate trends toward monopoly, doesn't say that 27 pct isn't enough. But he does accuse the Army, Navy, and Air Force of laxity in enforcing procurement regulations designed to help small business get its share of federal buying programs.

If the military would comply more carefully with procurement rules set up for the Defense Dept., the 27 pct figure would probably be much higher, according to Representative Celler. But, as the military chiefs put it, "you can't buy a battle wagon or a plane from a manufacturer that has less than

500 employees.

Military procurement regulations now in effect direct the armed forces to let "a fair proportion" of contracts to small business. But subcontracts are not now included, because of the administrative burden of "following through" on such arrangements.

The Defense Dept. explains that its policy is one of "encouraging, but not attempting to force" prime contractors to subcontract a percentage of their awards.

The procurement records of the Army, Navy, Air Force, and Armed Services Petroleum Purchasing Agency show that 72 pct of the purchase actions completed in fiscal 1949 were negotiated with small business. But dollar-wise, small business got only 27 pct of the \$5,456,898,000 total. Of this amount, the Army contracted with small businesses for 42 pct; the Navy, 32 pct; the Air Force, 11 pct; and the Petroleum Purchasing Agency for 5 pct.

Reynolds Metals Co. Expanding

Listerhill, Ala.—Reynolds Metals Co. has announced an \$8 million expansion program for its aluminum operations here, which will further integrate its operations in this area. The new facilities will include a cable plant with rod and wire mills and 20 stranding machines. The combined stranding facilities will produce cable at the rate of 1000 miles a day.

Five new Lewis high speed aluminum foil mills are also being installed to produce wider foil in a single operation. It is reported that the foil mills will operate at a speed of nearly a mile a minute.

Present facilities at Listerhill include sheet and rod mills. A reduction plant containing 4 potlines has been operating at capacity, producing 100 million lb per yr.

When completed early next year, the yearly capacity of the Listerhill plant will include 50 million lb of aluminum cable steel reinforced, 36 million lb of foil and 300 million lb of sheet.

Plans Harbor Development

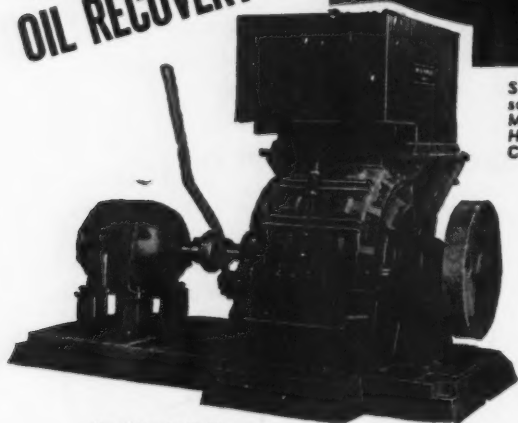
San Pedro, Calif.—Plans marking one of the first major developments at the Los Angeles harbor since the war, were announced as the Matson Navigation Co. and Los Angeles Harbor Commission revealed they will build a \$6 million passenger cargo marine terminal covering 46 acres.

Ford Cuts English Car Prices

Detroit—Devaluation of the British pound has brought with it substantial reductions in delivered prices of English-built Ford cars and trucks now available in the United States. Ford dealers in this country have announced price cuts ranging from \$379 to \$543 on English-built cars.

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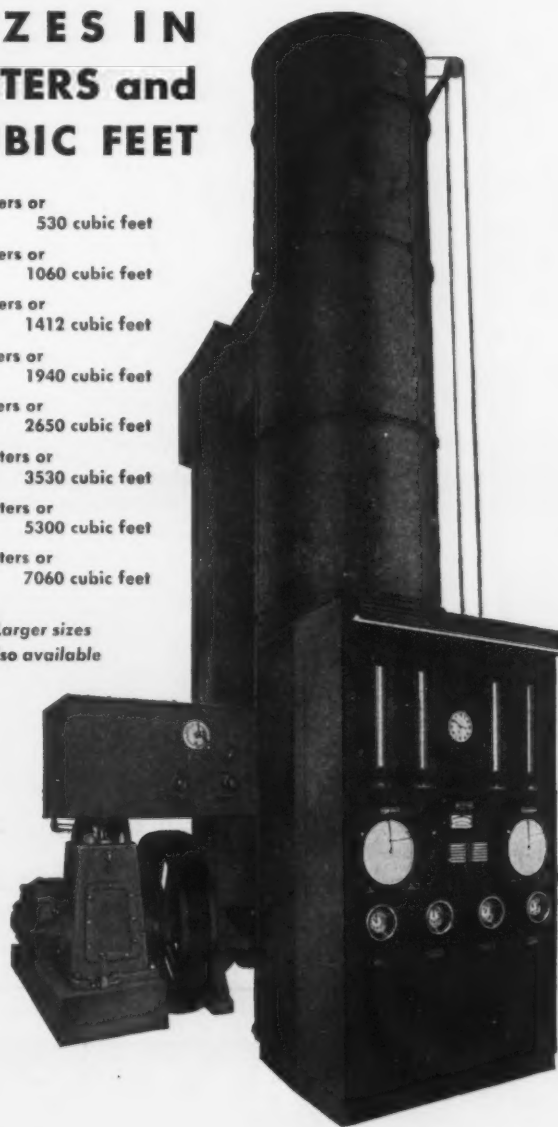
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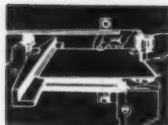
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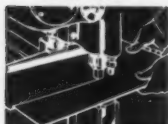
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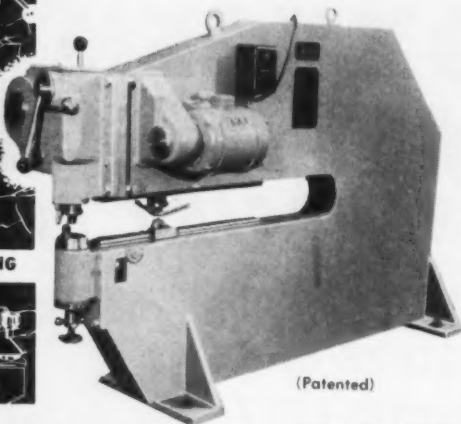
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Continued from Page 28

hydro-electric stations which are to be built.

After visiting Curitiba, San Paulo and Rio de Janeiro, the mission will proceed to North Brazil to inspect the electrification work in the San Francisco Valley.

To date, Brazil's loans from the Export-Import Bank total \$283,696,000, of which the Companhia Siderurgica Nacional (the national steel mill at Volta Redonda) has received 34 million.

Steel Mill Shows Profit

The balance sheet just published by the national steel mill shows a net profit of \$3,350,507 for the first 6 months of 1949. The profit on sales amounted to \$5,230,062. After transfers to reserve and renewal funds, payment of dividend at the rate of 6 pct. and of interest amounting to \$871,015 on the loan from the Export-Import Bank had been met, the balance of profits carried forward, including the balance of \$807,316 from last year, amounted to \$1,104,047.

According to the figures published by the Statistical Dept. of the Ministry of Agriculture, the principal producers of pig iron during 1948 were: Cia. Siderurgica Nacional, Rio de Janeiro, 224,025 metric tons; Cia. Belgo-Mineira, Minas Geraes, 102,953; Cia. Brasileira de Usinas Metalurgicas, Minas Geraes, 43,872; Usina Queiroz Junior, Minas Geraes, 36,518; Mineracao Geral do Brasil, San Paulo, 32,266; Cia. Ferro Brasileira, Minas Geraes, 30,971. The output of many smaller firms ranged from 2000 to 21,000 tons.

The Usina Queiroz Junior has recently increased capital from 100 to 300 million cruzeiros (\$5,400,000 to \$16,200,000), and the Mineracao Geral do Brasil is preparing to double its capacity.

French Iron, Steel Exports Rise

Paris—French exports of iron and steel products in September totaled 175,000 metric tons. This is 63,000 tons above the monthly average of the first 6 months of the year and 46,000 tons

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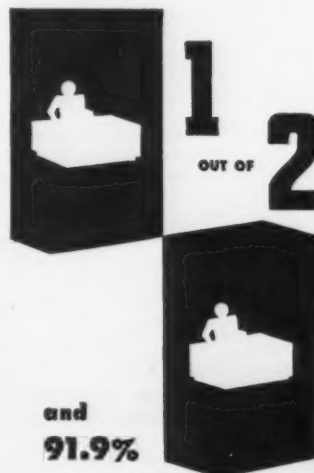
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GLOBAL LETTER

Continued

above the monthly level of 1938. The export rate is now approaching the best prewar records.

French Iron and Steel Exports (Monthly Average in Metric Tons)

	1st half 1949	July/ August	Sept.
To foreign countries	76,160	85,500	136,000
To French territories	35,500	28,500	39,000
Total exports	111,660	114,000	175,000

Discourage New Wage Requests

London—Employers in the shipbuilding and engineering industries have asked the unions to reconsider their decision to claim an all-round wage increase of \$2.80 a week, which it is estimated would cost at least \$280 million a year. The policy of wages restraint advocated by the government and supported by the central organizations of employers and workers remains unchanged, it is pointed out.

The purpose of devaluation of the pound—to reduce the price of exports—would be defeated by an increase of production costs. The balance of profits remaining after heavy taxation and necessary depreciation would in no way meet the claim.

Contract Details Completed For New \$60 Million Oil Refinery

Sao Paulo—The president of the National Petroleum Council is now in the U. S. in connection with the 45,000 bbl refinery to be acquired by the Federal Union at Santos, Brazil.

Bulk of the equipment is being purchased in France from the Compagnie de Fives-Lille and M. M. Schneider et Compagnie. But a contract has been signed with Pan American Hydrocarbon Research, Inc., for engineering and supplementary works and for the supervision of construction and initial operations.

The Bechtel Corp., who are acting as consultants for the Petroleum Council, estimate the cost of the installation, including freight and labor, at \$44,350,000. The additional expenditure for land, tanks, water and electricity systems will bring the total investment up to \$60 million.

The plant must be ready to operate within 4 years. It is expected to supply 50 pct of Brazil's petroleum requirements by 1953. Imports of gasoline, fuel and lubricating oils cost Brazil \$109 million in 1948.

Resume Reading on Page 29

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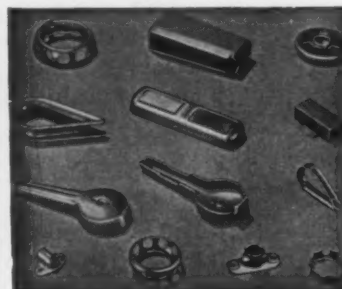
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Adv. on
page 74
Feb. 3
Iron Age

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Steel mill equipment demand increases since strikes

Materials handling units move in East

New Jersey dealers reorganize Materials handling units move

Strikes Cause Surge in Used Steel Plant Equipment Demand

Pittsburgh—The steel and coal strikes have had a depressing effect on the machine tool market generally, although one dealer in this field has noted a decided upturn in the last several weeks pointing to confidence in future business activity.

There is considerable activity in used steel plant equipment, including electrical apparatus, with both inquiries and active orders holding up well. With plenty of new surplus equipment becoming available, the feeling was that demand prospects are good. Fastest moving items are the strip and sheet rolling equipment. Perhaps the result of anticipated heavy demand for sheets when the steel strike ends, one company is considering placing back in operation a hand mill sold only recently. Negotiations are now underway toward this end. However, another steel producing plant is expected to be placed on the market within the next several weeks.

The Navy recently purchased a complete steel barrel-making plant for shipment to Guam.

Export business in used steel plant equipment has taken a nose dive here and several dealers attribute this to the fact that foreign countries armed with ECA funds are stepping out and buying new equipment in preference to used and rebuilt machinery. Most export business, such as it is, is coming from Italy, Holland and some of the Scandinavian countries. This applies also to machine tools.

When the current labor uncertainty blows over, it is expected that a structural plant in Western Pennsylvania will be placed on the market.

Machine Tool Inquiries Up; Electrical Machinery Needs Off

Pittsburgh — The sole machine tool dealer who reported increased activity said that inquiries have about quadrupled over the July-August bottom. The demand seems to be well diversified, covering a wide range of machines in contrast to the usual cycles in which demand centers on a few items.

A dealer in electrical machinery

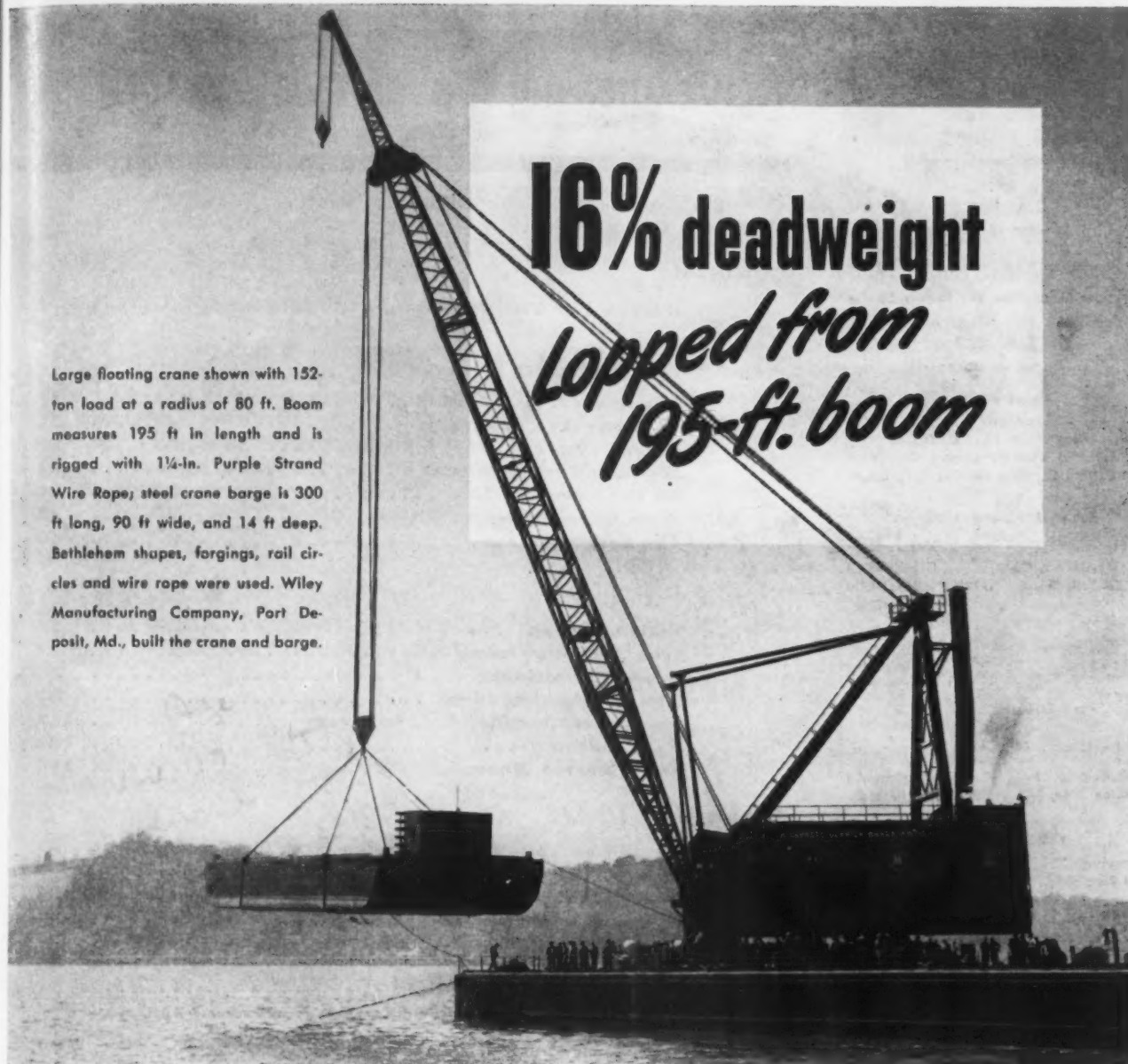
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MDNA CHAPTER SCHEDULES

Chapter	Date	Time	Place
Detroit	Tuesday, November 8	7:00 p.m.	Hotel Fort Shelby
Chicago	Thursday, November 17	6:30 p.m.	Steak House
New York	Monday, November 28	6:30 p.m.	Cavanagh's 23rd St.
Philadelphia	Tuesday, November 29	6:30 p.m.	Warwick Hotel
Los Angeles	Tuesday, November 29	6:30 p.m.	Los Angeles Elks Club

16% deadweight Lopped from 195-ft. boom

Large floating crane shown with 152-ton load at a radius of 80 ft. Boom measures 195 ft in length and is rigged with 1¼-in. Purple Strand Wire Rope; steel crane barge is 300 ft long, 90 ft wide, and 14 ft deep. Bethlehem shapes, forgings, rail circles and wire rope were used. Wiley Manufacturing Company, Port Deposit, Md., built the crane and barge.



This steam-powered floating crane was designed for erecting the steel platforms that support offshore oil-drilling operations in the Gulf of Mexico. The largest of its kind yet built, it has a lifting capacity of 150 tons at a radius of 80 ft.

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NOVEMBER 17, 1949 . . . VOL. 164, No. 20

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